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Report No. 7
Solid Waste and Public Cleaning

Contract Monitoring Plan

Solid Waste and Public Clean-Up Project Governorate of Alexandria, Egypt

USAID Contract LAG-I-00-99-00007-00,
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January 2001

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Prepared for
Governorate of Alexandria, Egypt
and
United States Agency for International Development

Prepared by
Abt Associates Inc.
The Institute for Public-Private Partnerships

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CONTRACT MONITORING PLAN

Solid Waste and Public Cleaning Project
Governorate of Alexandria, Egypt

INTRODUCTION

The Governorate of Alexandria (GOA) recently signed a contract with CEGA ONYX to provide solid waste and public cleaning services in the GOA. The GOA to ensure that the contract terms and conditions are being met, and that GOA residents are being provided the services as promised by the contractor must monitor this multiyear contract.

Contract monitoring is a necessary activity for the GOA as the buyer of the solid waste and public cleaning services, and ONYX, as the contractor that supplies the services. Contract monitoring ensures that each fulfills its contractual agreement. This Contract Monitoring Plan (CMP) is designed to achieve the following objectives:

- Ensure that the GOA and ONYX comply with all contract terms.
- Achieve prompt and fair resolution of any problems during performance of the contract services.
- Allow for negotiation of contract modifications.
- Ensure expeditious handling of invoices and payments.
- Attain high quality service performance in compliance with contract terms and specifications.

The Basis for Monitoring

The need for monitoring is inherent with contract administration. The purpose of this CMP is to define the performance requirements in the contract for each of the contract services. The purpose is consistent with the stated clauses in 5-4-5 of the Book of Conditions and Specifications that states that the GOA shall have the right to inquire and view the documents necessary for accomplishing contract monitoring. However, the GOA shall not interfere in the construction and operation of the solid waste and public cleaning facilities and programs.

The Scope of The Monitoring Plan

The CMP attempts to identify and address specific tasks that the GOA and ONYX are expected to perform under the contract. The CMP defines procedures for coordination, communication, and control of contract implementation and performance. The CMP addresses the following:

- The deliverables to be provided by the GOA and ONYX.
- The work that must be performed and the manner in which it is to be performed.
- The information to be provided by ONYX to the GOA as well as information to be provided by the GOA to ONYX.
- The sequence and scheduling of contracted solid waste and public cleaning service activities.

General Monitoring Guidelines

While certain activities of individual types of monitors will vary considerably as described in the appendix attached for each type of service, there are several functions that will be required of all monitors. These include, but are not limited to the following:

- Attaining complete familiarity with the contract terms and conditions.
- Understanding the service providers scope of work and proposed work plans; what they should or should not do.
- Conforming to the agreed method, times, and frequency of performance monitoring.
- Agree on schedule and nature of required reports; maintain files and records of action.
- Conduct periodic reviews of all data collected, including inspection reports, contractor's reports, and customer complaints.
- Identify trends or sequences of events that are taking place.
- Identify what corrective actions would be appropriate, take action, and follow up on those actions.
- Establish channels of communication with service users.
- Record type and frequency of consumer comments and complaints, so that an ongoing assessment can be made.
- Arrange for periodic meetings with the contractor to share concerns.

Adherence to these guidelines will greatly increase the probability of achieving project objectives in a manner that optimizes compliance of service delivery with contract terms and conditions.

Maintaining Monitor Independence and Accountability

A long-term contract entails an ongoing relationship between the vendor and the contract managers. Therefore the rules governing the conduct of the relationship must be formerly established up front.

The first is the traditional ethical problem of quid pro quo. To that end, department officials will make it clear to the contractor that all staff are independent, and are to remain at "arm's length" from the contractor to avoid conflict of interest. The policies and the accompanying rationale will be explained in a written document that includes examples of unacceptable practices. For example, one policy will be that the contractor may not pay for meals or supply tickets for sporting events. Employees cannot solicit or accept such benefits.

The second danger arises from the human element of the working relationship. While trust and civility are important, the monitor must guard against a gradual yet insidious relaxation of the independence and objectivity needed for monitoring and enforcing the contract. To ensure against such an unacceptable result, all contract administration will be subject to removal for cause (e.g., proven misconduct in maintaining independence). Such a process will require transparency, with reasons for any decision being based on credible and defensible evidence.

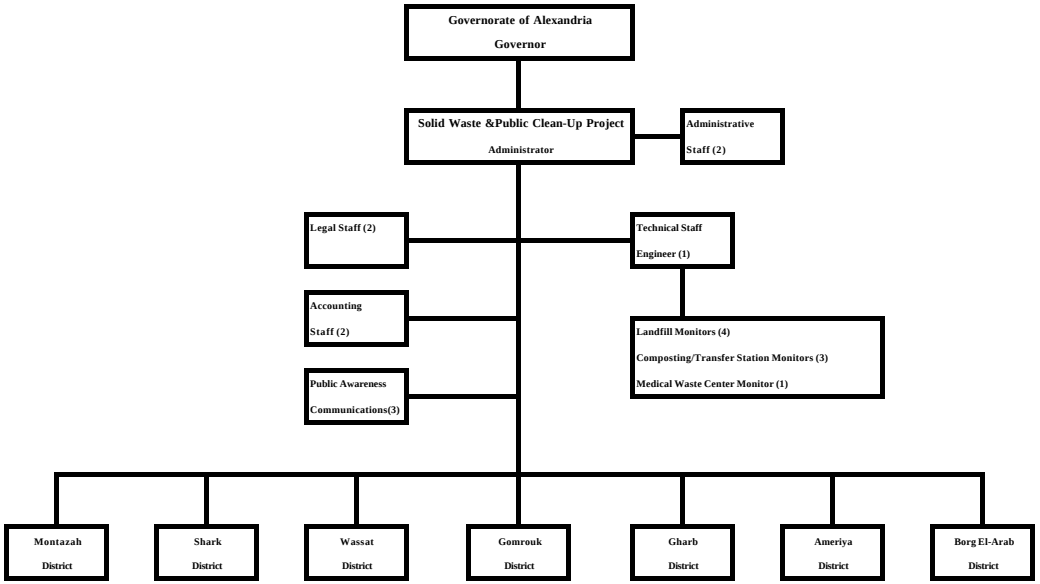
In summary, the department will aggressively endeavor to establish and maintain open, above-board businesslike relationships with all contractor personnel that do not leave employees, the contractor, or the general public with questions about the parties' motives.

CONTRACT MONITORING ORGANIZATIONAL STRUCTURE

The new Solid Waste Management Department will be responsible for all aspects of project implementation and contract administration. The two-tiered organizational structure illustrated in Exhibit 1 will facilitate the GOA's objective of maximizing contractor accountability and overall compliance with contract terms and specifications.

The first tier, at the GOA level, will provide the over all clean-up project contract administration and all organizational support functions. The second tier, at the local level, encompasses the actual field monitoring of all contractor services that are

EXHIBIT 1. CONTRACT MANAGEMENT AND MONITORING ORGANIZATION CHART



Manager and Administrative Staff	2	2	2	1	2	2	1
Waste Collection and Public Clean-Up Monitors	20	27	24	6	12	9	2
Industrial Waste Collection Monitors	6	3	1	1	4	2	2
Medical Waste Collection Monitor	1	1	1	0	1	1	0
Complaints and Fines	3	3	3	1	2	1	1
Public Awareness/ Communications	1	1	1	1	1	1	1
Total Per District	33	37	32	10	22	16	7

Subtotal for All Districts	157
Subtotal for Governorate	19
Total Staff	176

performed on a GOA wide basis. All staff at both levels will have the benefit of intensive and focused professional training.

CONTRACT MANAGEMENT - GOA LEVEL

The GOA level staff and the District Managers will report directly to the Program Administrator. The Program Administrator will report to the Secretary General. The staff at the GOA level has been organized to provide the following:

- Organizational management and strategic direction of the new Solid Waste Management Department within the GOA.

- Contract management and overall performance evaluation of the contractor providing the services.

- Functional organizational support services including the following:

    - Legal
    - Financial
    - Accounting
    - Public Awareness/Communications Coordination
    - Technical

The management level positions provide the leadership of the Solid Waste Management Department that will oversee the contractor. The GOA level management structure includes the following:

- Program Administrator
- Legal Staff
- Accounting Staff
- Public Awareness/Communications Coordinator
- Project Engineer

Monitors that will be assigned to the fixed facilities including the waste treatment centers and the new sanitary landfill will report directly to the Project Engineer and include:

- Landfill Monitors
- Composting Facility/Transfer Station Monitors
- Medical Waste Collection and Treatment Center Monitors

The monitors will be located at the fixed facility they will be monitoring. The contractor will provide office space and a phone line for the sole use of the monitor at each of the fixed facilities. All other GOA level staff will be housed in offices provided by the GOA.

The areas of responsibility and specific duties of all GOA level managers and their staff are described below.

Program Administrator

Implementation of the full scope of solid waste and public cleaning services is expected to require an annual budget exceeding 70 million LE. Contract management and monitoring will require a staff of approximately 150 professionals. To ensure the greatest possible return on its substantial investment in these highly visible services the GOA has appointed an experienced Program Administrator to provide overall management of the project and the new Solid Waste and Public Cleaning Department.

Duties and Responsibilities: Program Administrator--

The Program Administrator will be responsible for the ultimate success or failure of the implementation of the solid waste and public cleaning project and the monitoring plan. To enhance the probability of contractor compliance and project success, the Program Administrator will be responsible for the following:

- Providing strategic program direction for the new Solid Waste and Public Cleaning Department.
- Establishing program goals and individual service objectives.
- Managing and directing a staff of approximately 150 professionals.
- Developing and meeting an annual budget.
- Evaluating funding sources to determine the adequacy of funds to pay for the services being provided by the contractor.
- Preparing and submitting reports to the Secretary General, Governor, and the Chairman of the Local Popular Council pertaining to the status of project implementation, the adequacy of funding, and the performance of the contractor.
- Providing testimony at local and national legislative and regulatory hearings.
- Making formal presentations at national and international conferences.
- Promoting the project goals and objectives to the public.
- Taking all practical and necessary steps to maximize service contractor compliance with contract terms and conditions.
- Motivating high levels of performance from staff by providing leadership based on employee empowerment and incentives.

Legal Staff

The solid waste and public cleaning contract management organization will require in-house legal expertise for evaluating contractor compliance with all contract terms and for provision of internal legal services. It is envisioned that one attorney and an administrative assistant will suffice for the organization needs.

Duties and Responsibilities: Legal Counsel--

The duties and responsibilities of the legal counsel will include, but not be limited to, the following:

- Evaluating contractor compliance with contract terms.
    - Clause 3.3 Subcontracting
    - Clause 3.4 General Provisions
    - Clause 3.11 Insurance
- Preparing documentation for imposition of contractor penalties and fines.
- Developing and reviewing vendor contracts.
- Conducting research on environmental law.
- Representing the interests of the Solid Waste and Public Cleaning Department in all legal matters.
- Negotiating contract revisions with the contractor as needed.
- Drafting legislation or amendments to existing GOA ordinances and/or national laws.
- Advising organization staff of legal rights and obligations in dealing with the public.
- Providing counsel to the Project Administrator on an as needed basis.

Accounting Staff

The solid waste and public cleaning contract management organization will require accounting services on a full time basis. It is envisioned that one accountant and an administrative assistant will suffice for the organization needs.

Duties and Responsibilities: Staff Accountant--

The staff accountant will perform all activities associated with the receipt and payment of funds required for maintaining the department on a sustainable basis. Activities will include, but not be limited to, the following:

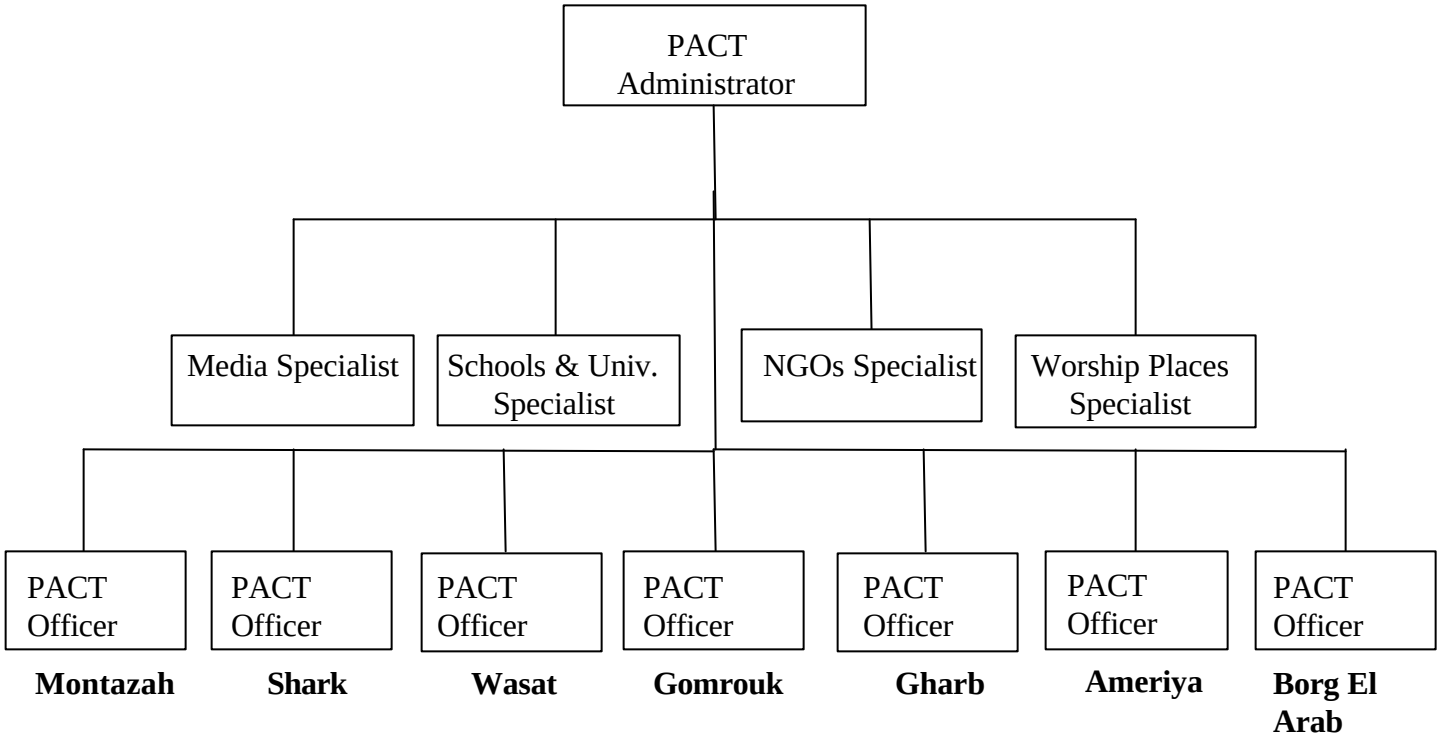
- Receive and manage dedicated fees from the electric utility.
- Manage the audit of the electrical utility fee assessment database.
- Process contractor invoices.
- Process invoices from vendors and suppliers.
- Maintain responsibility for staff payroll and all fringe benefits.
- Perform analyses to ensure that future costs and cost recovery levels remain in balance.
- Coordinate preparation of annual budget in conjunction with Program Administrator.
- Design, implement and administer a cost control system.

Pubic Awareness and Communications Team (PACT)

Public awareness and cooperation with cleanup objectives is essential for project success. Project goals will be extremely difficult to achieve without the widespread support and cooperation of GOA residents, businesses, and visitors. Maintaining a clean Alexandria that is an inviting tourist destination will depend more on changing waste generator habits, than on the proficiency of the service contractor.

A PACT Coordinator, together with a communications staff organized as illustrated in Exhibit 2, will have the responsibility for winning public support and improving existing waste handling behavior. Job descriptions for each of the functions to be provided by PACT staff are attached as Appendix G. The Coordinator will also monitor contractor compliance with Book of Conditions and Specifications clause 5-6-1 requiring contractor development and implementation of a campaign to promote improved public waste handling habits.

EXHIBIT 2. PACT ORGANIZATIONAL CHART



Duties and Responsibilities: Public Awareness and Communications Team Coordinator--

The duties and responsibilities of the Communications Coordinator will include, but not be limited to, the following:

- Development, implementation, and management of GOA-wide Solid Waste Management Project awareness and promotion campaign.
- Development of requests for proposals from public relations firms.
- Development of communication work plans and budgets.
- Development and implementation of a strategy to minimize potential public opposition to the siting of medical waste treatment centers and new sanitary landfills.
- Direction and coordination of local GOA office communications staff activities.
- Preparation of news articles and press releases.
- Planning and organizing events to promote the solid waste and public cleaning project.
- Coordination of GOA communications efforts with the ONYX enlightenment campaign.
- Development of written materials for dissemination through schools and other civic organizations.
- Identification and/or creation of opportunities for project publicity.
- Providing the Program Administrator with materials for public appearances and formal presentations.
- Working with news media (i.e., TV, radio, and newspapers) to optimize project coverage and publicity.
- Coordinating activities with contractor public relations personnel to optimize consistency and the impact of messages.
- Preparing communications program status reports for the Program Administrator.
- Preparation and delivery of presentations at government and business seminars.
- Design, management, and implementation of surveys to measure citizen/business satisfaction with quality/performance of contract services.

Project Engineer's Office

The size and importance of the GOA's capital investment warrantS professional technical oversight of contract engineering and technical specifications. The GOA will therefore employ an engineer to supervise individual monitoring technicians placed at each of the fixed facilities installed and operated by the contractor. The engineer will report directly to the Program Administrator.

Duties and Responsibilities: Project Engineer--

The GOA Solid Waste and Public Cleaning Project includes capital investment in construction of fixed facilities, such as transfer stations, a medical waste treatment center, a new sanitary landfill, rehabilitation of three composting facilities, and closure of the existing open dumps. The timely and technically proficient design, site development, construction, equipment installation, and day-to-day operation of these fixed facilities are essential to the success of the integrated solid waste management system.

The Project Engineer will be charged with ensuring that each solid waste handling and disposal facility is designed, constructed, and operated in accordance with contract technical specifications, approved design plans, all applicable EEAA regulations, and in the best interests of the GOA. The duties and responsibilities of the Project Engineer will include, but not be limited to, the following:

- Oversight of fixed facility design, construction, and operation to ascertain compliance with good engineering practices and all applicable governmental health, safety, and environmental regulations.

- Preparing technical oversight work plans and budgets for the Program Administrator's review and approval.

- Managing technical oversight programs within approved budgets.

- Provide direction and coordinate activities of monitoring technicians located at each fixed facility.

- Oversight and consulting with the contractor's technical staff during design, construction, and operation of the fixed facilities.

- Preparing and submitting periodic technical reports to the Program Administrator.

- Reviewing and summarizing reports from monitoring technicians for the Program Administrator.

- Consulting with legal, financial, and communications staff on an as needed basis to enhance and facilitate project progress toward goals.

- Identify potential technical problems and cooperate with contractors in development of mutually acceptable remedies.

- Provide testimony at legal, legislative, and regulatory hearings.

- Make technical presentations at regional and national conferences.

- Prepare and submit reports to EEAA regarding facility compliance with regulations.

- Maintain technical proficiency and knowledge of emerging technologies through training and participation in professional forums.

The specific activities of the monitors working for the Project Engineer are described in the appendices addressing the new sanitary landfill, medical waste treatment center, and composting facilities.

MONITORING FIXED FACILITIES

Contracted services include the design and construction of a new sanitary landfill and a medical waste treatment center. Additional services include the rehabilitation, outfitting, and operation of three existing composting facilities. The contractor may also construct facilities for transferring waste from collection vehicles to larger trucks for transport to the composting facilities or new sanitary landfill. As integral elements of the overall solid waste management system, it is imperative that each of these facilities be operated in accordance with all contract service and technical specifications.

To ensure compliance, GOA monitors will be placed on site at each fixed facility. Separate monitoring plans for the sanitary landfill, the medical waste treatment center, and the three composting facilities are attached as Appendices A, B, and C respectively.

MONITORING - LOCAL LEVEL SERVICES

As per the Book of Conditions and Specifications, the following public cleaning services are to be provided in all districts within the GOA:

- Waste Collection Services

  - Collection of Residential and Domestic Waste
  - Collection of Different Wastes and Garbage

- Street Sweeping and Cleaning Services

  - Mechanical Sweeping
  - Manual Sweeping and Garbage Pickup
  - Beach Clean-up
  - Cleaning Tunnels and Bridges

- Cleaning Statues, Memorials, and Fountains
- Removal of Dead Animal Bodies

- Medical Waste Collection Service

- Industrial Waste Collection Service

All of these services will be monitored from the district level. The contractor has developed work plans based on the eighteen electric utility zones. The GOA will monitor contract services from six district offices. Each office will have a manager and supervise three service zones.

Assignment of Monitors

The oversight and monitoring of all waste collection and street sweeping and cleaning services have been assigned to the Waste Collection and Public Clean-Up Monitors to minimize unproductive travel time and maximize their productivity. Separate Medical Waste Collection and Industrial Waste Collection Monitors will oversee medical waste collection and industrial waste collection services respectively. Separate monitoring plans for these three types of local level monitors are provided in Appendices D, E, and F.

Complaints and Fines Coordination

A means for efficiently processing contractor noncompliance forms turned in by the field monitors, as well as service user violations and complaints received from the public are necessary within each district office. This will require a minimum of at least one full time staff person per ten field monitors in each local office to track responses to notification of non-compliance or legal violation. After adequate time for response has passed non-response cases will then be sent to the legal staff.

Complaints and Fines Staff Activities--

The first responsibility of the Complaints and Fines Coordinators will be to read and attain total familiarity with the *Book of Conditions and Specifications* and the work plans submitted by ONYX. Special attention should be given to Clause 3-7-5, which enumerates specific violations, the amount of the fine associated with each and the procedures that must be followed in their assessment.

The ongoing activities of the Complaints and Fines Coordinators will include, but not be limited to, the following:

- Processing complaints received from the public:

  - Recording information from telephone calls or office visitors
  - Transmitting information to monitors and/or the contractor.
  - Tracking progress on resolution of warnings, fines, and penalties.
  - Notifying legal staff of unresolved complaints and violations of the law.

- Maintaining complaint files.

- Processing reports of non-compliance from monitors:

  - Preparing formal documentation from field reports.
  - Transmit copy to contractor with request for appropriate remedy.
  - Track progress of resolution.
  - Receive and file resolution forms from contractor and copy the monitor.
  - Transmit unresolved non-compliance cases to legal staff.

- Processing citations issued by monitors and public violators of waste/litter handling laws:

  - Prepare forms from field written citation.
  - Transmit formal notice to violator with proposed remedy and time schedule.
  - Notify contractor on need to know basis.
  - Track progress on resolution through field monitors.
  - Maintain records.
  - Notify legal staff of violator failure to resolve conditions of non-acceptance.

Equipment and Supplies--

Facilitating the work of the Complaints and Fines Coordinators will require provision of the following at each District office:

- Office space and furnishings.

- Computers networked with the central office.

- Dedicated telephone lines.

- Standard reporting forms.

- Maps illustrating contractor waste collection and street sweeping routes/ schedules.

The Basis and Scope of Monitoring Activities

Clause 5-4-5 referenced in the Introduction provides the legal basis for monitoring. The scope of monitoring activities is prescribed by the terms and conditions established and agreed upon in the contract documents. Clause 3-2-1 of the Book of Conditions and Specifications states that the tender submitted by the contractor (including required work plans), and any documents, drawings, or charges to be agreed upon shall form part of the contract documents.

Contract clause 3-4-3 states that the contractor will be responsible for the technical and financial obligations in the contract. The clause further states that the contractor will be responsible for providing all labor, supplies, and equipment needed to complete the work stated in the contract.

In summary, it is clear that the monitors, as the designated representatives of the GOA, have the authority to oversee all preparation and execution activities of the contractor. The monitor's purpose is to assess contractor compliance with the Book of Conditions and Specifications and with tender work plans and subsequent drawings and associated documents. Thus, the individual monitoring work plans presented in Appendices D, E, and F follow a similar format:

- States pertinent service and technical specifications.
- References and summaries of the applicable contractor work plan.
- Prescribes monitoring activities designed to measure compliance.

Management of Local Service Monitors

Well-trained and motivated monitoring teams will greatly enhance the probability of achieving the GOA's Solid Waste and Public Cleaning Project goals and objectives. With an efficient management structure, this cadre of skilled monitors supported by communications and administrative staff will actively demonstrate the GOA's commitment to maximizing the return on the investment to its residents and businesses in the contractor's services.

Experienced management is required to plan, coordinate, and oversee all of the various activities for the purpose of optimizing service use and the contractor performance of locally provided services.

Local Managers will supervise staffs ranging in size from 10 to 40 persons (See Exhibit 1), facilitate staff work, and optimize productivity. The duties and responsibilities of the District Managers will include, but not be limited to, the following:

- Implementing the monitoring and communications strategies developed at the GOA level.

- Allocating and assigning specific work areas within the Local region to match contractor service zones.

- Directing and coordinating the activities of all monitoring personnel working in the local office.

- Sharing experiences and lessons learned from monthly meetings of all District Managers.

- Motivating high performance standards through team management and empowerment techniques.

- Promoting project goals through public meetings and presentations.

- Analyzing field and public complaint reports to identify priority needs and revise resource allocation.

- Providing written reports to the Program Administrator on a weekly basis.

APPENDIX A
SANITARY LANDFILL MONITORING PLAN

INTRODUCTION

The Project Engineer will manage, as well as participate in, the monitoring of the design, construction and operation of the new sanitary landfill in Borg Al Arab. Monitoring will be premised on evaluating contractor compliance with technical specifications contained in Clauses 5-2-7, 5-3-1, 5-3-3, and other universal service specifications included in the *Book of Specifications and Conditions,* as well as the work plans and landfill design drawings submitted with the tender.

Monitoring of the contracted service for landfill design, construction, and operation services will take place in four distinct stages:

- Design
- Construction (Preparation)
- Operation (Execution)
- Closure (Evacuation)

Landfill monitoring activities prescribed for each stage are addressed separately below.

MONITORING LANDFILL DESIGN

Monitoring contractor compliance with technical design specifications and design process requirements is a prerequisite to attainment of GOA environmentally responsible solid waste disposal objectives.

Landfill Design Specifications

The Book of Conditions and Specifications provides landfill design specifications in Clauses 5-3-1 and 5-3-3-8. The clauses require the contractor to submit a design including preliminary drawings for approval by the GOA. The design must take into consideration that the land fill capacity must be adequate for a period of 15 years and the necessity of observing all environmental requirements and conditions in a manner leaving no effect on the areas around the sanitary landfill and groundwater.

The sanitary landfill design shall apply globally accepted environmental best practices relating to each of the following control systems:

- The type and thickness of the bottom liner and liner material(s) to be used.

- Cell bottom height above the high groundwater elevation.

- The plan for walls, fencing, and landscaping.

- The plan for leachate collection and treatment.
- The plan for gas monitoring, collection, and control/use.
- The number, type, sampling frequency, and location of groundwater monitoring wells.
- The type, depth, application and maintenance plan for final cover material, grasses and trees.

The contractor shall carry out an Environmental Impact Assessment (EIA) study and obtain approval of the study from the EEAA.

Contractor Landfill Design Work Plan

ONYX has submitted a preliminary plan for converting the Borg El Arab Quarry into a sanitary landfill that is designed to achieve the following objectives:

- Remediation of the instability of the quarry walls.
- Protection of the surrounding environment from gaseous emissions.
- Collection of storm water and minimization/control of leachate.
- Compatibility with the surrounding land use which includes residential and agricultural areas.

To achieve these objectives ONYX proposes the following modifications and operational plans for the site:

- Redefine the southern high wall and re-balance the slopes of the Northern high wall.
- Monitor, collect, control, and utilize landfill gas.
- Monitor, collect, and control storm water and leachate .
- Plant and cultivate trees and vegetation before, during, and upon completion of landfill operations to minimize visual and environmental impacts.

Work Plan 3.10 of the tender offer, *New Sanitary Landfill*, provides detailed plans and design calculations required for implementation of site modifications and operational procedures designed to achieve project objectives. The Work Plan also comprehensively addresses all landfill design specifications, with the exception of carrying out and obtaining approval from EEAA of an Environmental Impact Assessment (EIA).

GOA Monitoring of the Landfill Design Process

The Project Engineer will be responsible for oversight of the landfill design process for the purpose of ensuring contractor compliance with all applicable procedural and technical specifications. Five landfill monitors who will be assigned to monitor landfill operations during all operating hours and will report to the Project Engineer.

GOA monitors will oversee the entire design process with attention being given to compliance with the above technical specifications and the final design approved by the GOA and the EEAA. It is essential that all landfill monitors read and become intimately familiar with the detailed technical specifications contained within Clause 5-3-3 of the *Book of Conditions and Specifications.*

The design process to be overseen by the Project Engineer consists of the following steps:

- The contractor includes preliminary drawings for construction of the sanitary landfill, and work plans for its implementation, operation, and closure in his offer.

- Upon signing the contract, the contractor receives the landfill site and begins preparing detailed landfill construction and development design drawings.

- The contractor carries out an EIA study for review and approval by the EEAA.

- Detailed drawings are submitted to the GOA for review, inquiry, and suggestion of any modifications.

- GOA approval provided after contractor responds to inquiries and proposed modifications

- Upon GOA and EEAA approval, the contractor prepares and submits a schedule for construction and development not exceeding one year from the date of the contract signing.

Monitoring of the sanitary landfill design process will require the following specific activities to be performed by the Project Engineer with the assistance of the landfill monitors:

- Review landfill preparation stage work plans and preliminary drawings for familiarity and contractor compliance with the *Book of Conditions and Specifications* tender offer submittal requirements. These should address:

    - Recruiting and employing the labor force and technicians required.
    - Equipment procurement process and schedule.
    - Equipment installation schedule.
    - Project management.
    - Administrative staff and labor force training.

- Review detailed drawings submitted for compliance with the technical design specifications contained in Clause 5-3-3 of the *Book of Conditions and Specifications* to ensure that:

  - Design capacity is adequate for 15 years (Project Engineer should check calculations and ensure population increases are included).

  - Proposed depth of excavation does not exceed groundwater table level.

  - Landscaping, including the planting of trees and bushes around all entrances and the entire perimeter is included in the design.

  - Design drawings for support facilities are adequate and include buildings/shelter for administration, equipment protection and maintenance, power generation, water supply, and fire and safety equipment.

  - A provision is made for two computerized truck scales with a minimum capacity of 60 tons and is not less than 60 feet in length.

  - Design drawings include the installation of area for washing truck wheels prior to truck exiting landfill site.

  - Provisions for signage locations including:

    -- On the road leading to the site indicating name of the site, name of the GOA, name of the contractor, working hours and telephone number.

    -- At the entrance near the scale house a description of site usage rules and regulations, safety instructions and fines for violation.

    -- Along internal roads directions to the dumping area and warning signs indicating dangerous locations.

- Review drawings for compliance with the following environmental protection systems specified in Clause 5-3-3-8 of the *Book of Conditions and Specifications*:

  - Selection and installation of a liner material on the floor and side slopes of the waste cell that was specified in the EIA submitted and approved by the EEAA.

  - A system to collect and treat all water emanating from the decomposing waste.

  - A system for collection and treatment of methane gas produced.

  - A groundwater monitoring system indicating the number and placement of all sampling wells. If it is determined that groundwater is present under the site.

- A plan for final cover including quantities and types of vegetation proposed and the means for maintaining site aesthetics.

- Document findings of non-compliance with design specifications and submit inquiries and/or proposed modifications to the contractor's landfill design manager.

- Review contractor responses and attend regularly scheduled meetings with landfill design personnel to facilitate and expedite problem resolution and consensus.

- Prepare and submit weekly landfill design status reports to Program Administrator summarizing non-compliance items identified, proposed modifications, and areas of consensus.

- Prepare and submit a final report containing recommendation of GOA approval of complete landfill design plan at the end of the design development and review process.

MONITORING LANDFILL CONSTRUCTION

The second paragraph of Clause 5-3-1 of the *Book of Conditions and Specifications* directly addresses GOA oversight of landfill construction. It states that the GOA will appoint a representative to supervise the entire installation process through completion to ensure that the installation is carried out according to the conditions and specifications identified and approved in the design and detailed drawings.

The Project Engineer will represent the GOA in the performance of this oversight responsibility.

Landfill Construction Specifications

The specifications for the construction of the sanitary landfill are clearly stated in Clauses 5-3-1, 5-3-3, and 5-2-7 of *the Book of Conditions and Specifications*. The first (5-3-1) requires submittal of a construction schedule. Then upon obtaining the GOA's approval of the design drawings and related details, the contractor shall set a schedule for execution of the required work within a period not exceeding one year from the date of contract.

Landfill Construction Technical Specifications—

Clause 5-2-7 specifies the technical steps to be taken during construction by the contractor. The steps to be taken during the construction stage include the following:

- Locate and prepare area for first cell.
  - Excavate to approved design depth.
  - Level cell floor.
  - Install synthetic or bentonite clay liner.

- Install leachate control and treatment system.

- Install leachate collection system.
- Construct leachate treatment plant.
- Install groundwater-monitoring wells.

- Install road network.

  - Entrance road from main highway to scale house.
  - Inner roads to first cell and ancillary support areas.
  - Roads to monitoring sites.

- Install gas monitoring, collection, and control/use system.

  - Install gas migration detection system.
  - Install gas collection system.
  - Install gas-processing system.

- Construct surface water control system.

- Establish separate burial cells for special wastes.

  - Slaughter house wastes.
  - Ash from medical waste treatment center.

- Landscape entrance and fence entire site.

- Construct support buildings.

  - Office/scale house.
  - Space for employee check in and clean up, breaks, eating, tools, protective clothing, and training.
  - Maintenance and service building.
  - Power generation.
  - Fire fighting equipment.

- Install scales and supporting facilities.

  - Minimum 60-ton capacity.
  - Minimum 20 meters in length.
  - Computerized recording of data including truck number, material type, and source.

- Install outgoing truck wheel washing area.

- Erect guidance signage.

  - At entrance from highway.
  - At the scales.

- Directions along internal roads to operating cell.
- Identification of potential hazards for safety.
- Identification of support facilities and monitoring sites.

Monthly Reporting Specifications—

Clause 5-4-2 of the *Book of Conditions and Specifications* requires monthly reports during the preparatory stage of the project. These reports must be submitted within one week from the end of the month being reported on. The preparatory stage reports must clearly describe the progress made to date regarding all work prescribed in the preparation plan. Moreover, the reports must explain as well any delays or difficulties the contractor faces or expects, in order to take the necessary procedures for tackling and solving them in coordination and cooperation with the GOA.

Contractor's Landfill Construction Work Plan

The tender submitted by ONYX contains detailed descriptions of the steps to be taken to comply with each of the technical specifications included in Clause 5-2-7 of the *Book of Conditions and Specifications.* These detailed descriptions, together with background information and calculations supporting each construction element proposed, are contained on pages 15 through 53 of Work Plan *3.10, New Sanitary Landfill.* Brief summaries of the construction plan designed to comply with the technical specifications follow.

Cell Construction—

The plan calls for excavating and grading the bottom of the quarry to facilitate liner installation and promote leachate collection and control. Installing an anchoring system consisting of horizontal concrete beams along the floor and vertical beams extending up steep cell walls will then stabilize any steep quarry walls.

The lining of each cell will consist of (from quarry bottom to top) a thick puncture resistant geotextile, 0.50 m of bentonite clay, a waterproof geomembrane, and puncture resistant geotextile, and a 0.3 m layer of gravel for leachate drainage. This liner will be integrated into cell walls that separate individual cells. Additional details can be found on Pages 21 – 27 of the Work Plan.

Leachate Control—

Due to meteorological conditions the amount of leachate production will be minimal. The slope and thickness of the cell walls are designed to promote quick collection of any leachate produced. Any leachate collected will be drained and/or pumped to a storage basin and ultimately re-circulated through the landfill to enhance waste decomposition. Rainfall amounts and leachate production will be continuously monitored to allow maintenance of an optimal water balance. Further details are provided on Pages 45 through 47 of the Work Plan.

Road Network—

Two types of roads are proposed. Permanent roads 8 m wide will be constructed from the highway to the scale house, from the scale house to the usable landfilling area, and around the perimeter of the site. Temporary roads will be constructed to operating cells and ancillary support areas in conjunction with the movement of operations.

Detailed road specifications and construction scheduling can be found on Pages 18 and 19 of the Work Plan.

Gas Monitoring, Collection, and Control—

Based on estimates of gas production, ONYX has proposed that 120 wells, 20 m deep and 400 mm in diameter be installed over the course of the 15-year operation. Approximately 8700 m of 300 mm HDPE tubing will be used to connect wells to five pumps each with a capacity of 770 m^3 per hour. Continuous monitoring of the quantity and quality of landfill gas has also been provided for in the Work Plan.

During the first five years the rate of gas production will not be enough o justify gas utilization, so it will be flare combusted. After the fifth year of landfill operation ONYX proposes to treat the gas and use four generators to generate between 650 to 9,300 kilowatts of electricity per day.

Detailed calculations and explanations supporting the proposed system to be constructed are presented on Pages 34 to 43 of the Work Plan.

Surface Water Control—

ONYX proposes to install catch basins at the top and bottom of northeast/southwest slopes and direct the water to Lake Maryut. Provisions of collection and control of runoff from roads and paved areas of support facilities are also described on Pages 48 through 51 of the Work Plan.

Separate Burial Sites for Special Wastes—

The ONYX Work Plan provides for construction and operation of a separate landfill cell for medical wastes and composting facility residues. Operational and environmental control issues are addressed in separate sections that accompany each facet of domestic waste landfill operations.

The specification requiring a separate cell for disposal of slaughterhouse wastes is not addressed. ONYX has proposed setting aside an area for disposal of hazardous industrial wastes should the GOA desire that service at a later date.

Landscaping—

The Work Plan proposes surrounding buildings with green areas that help visually and physically separate the entrance area from the operating area. These green areas are proposed to be aesthetically appealing to the view of neighboring residents, businesses, and passing motorists.

For final cover, the Work Plan submitted proposes a 0.75m clay cover topped with dust and organic compost to promote vegetation. All slopes will be covered by organic braid (coconut fiber) to combat erosion, absorb moisture, and encourage plant growth. Finally, plants and trees will be placed on completed sections of the landfill as soon as final elevations are reached.

The requirement for fencing the entire site is also acknowledged and provided for in the Work Plan.

Support Buildings—

The ONYX Work Plan complies with the technical specification for construction of support buildings. The support buildings and amenities proposed include the following:

- Receiving Center
    - Receiving Hall
    - Dining Room
    - Kitchen
    - Changing Room
    - Prayer Hall
    - Scale Control and Office
    - Management Offices
    - Equipment and Machinery Maintenance Facility
    - Restrooms
- Two garages for repair and spare parts.
- Electrical Power Network
    - Outdoor illumination of all support buildings and work areas
    - Telephone network between all support buildings
- Drinking Water Network

Scales and Supporting Facilities—

The ONYX Work Plan provides for installation of scales with 60-ton capacity and 20 meters in length as specified.

Truck Wheel Washing Area--

The ONYX Work Plan proposes installation of a 3 m by 20 m concrete pad where truck wheels can be washed. The area will be equipped with high pressure washing equipment and a 2,000 liter tank to collect wash water prior to emptying in the leachate storage basin.

Erection of Guidance Signage—

The Work Plan proposes installation of signs indicating the entrance with all information pertinent to facility usage provided on signs at the scale house. All transportation areas will be provided with directional, speed, and safety signs.

GOA Monitoring of Construction

During the construction stage the GOA landfill monitors will oversee site development fulltime. This fulltime onsite presence will be supplemented with frequent and lengthy visits of the GOA Project Engineer to maintain first hand knowledge of construction progress and procedures. Monitoring activities that concentrate on contractor compliance with the technical specifications listed above include the following:

- Monitor preparation of first cell to ensure:
  - Excavation and grading at approved design depth.
  - Preparation of a sloping floor to enhance the collection of leachate and promote storm water drainage.
  - Stabilization of quarry walls as proposed.
- The liner material and installation procedures must confirm to the requirements stated in the Work Plan submitted by Onyx.
- The leachate drainage layer consisting of permeable material with granules between 20/40mm with thickness 30cm must be placed in a manner that allows for the transport of leachate to the collection system.
- Monitor installation of leachate control and treatment systems.
- Monitor installation of gas monitoring, collection, and control/use systems.
  - Installation of gas migration detection system.
  - Installation of wells and gas collection system.
  - Installation of gas treatment/use system.

- Monitor construction of the following for strict compliance with specifications submitted to and approved by EEAA and GOA:

  - Entrance, access, and internal roads.

  - Surface water control system.

  - Support buildings including office/scale house, electrical and water supply, fire prevention and maintenance shop.

  - Outgoing truck wheel washing area including wash water supply, collection, storage and disposal systems.

- Monitor installation of scales.

  - Minimum 60 ton capacity.

  - Minimum 20 meters in length.

  - Proper testing by national weights and measures agency.

  - Computerized recording of data including truck number, and material type and source.

- Monitor landscaping and signage installation.

  - At entrance from highway.

  - At the scales.

  - Directions along internal roads to operating cell.

  - Identification of potential hazards to safety.

  - Identification of support facilities and monitoring sites.

MONITORING LANDFILL OPERATION

Upon completion of the installation and outfitting of the new landfill the contractor must commence the execution of the Operational Work Plan submitted in the tender.

Landfill Operation Specifications

The *Book of Conditions and Specifications* contains several general, technical, and reporting requirements relating to the operation of the new sanitary landfill.

Landfill Work Plan Specifications—

Clause 4-3-2(b) of the *Book of Conditions and Specifications* requires inclusion of Execution Stage (Operation) Work Plans in the tender offer for the sanitary landfill stating:

Operational Work plans are required to include a description of the following:

- Number, qualifications, and fields of specialization of labor force and technicians.
- A safety and security plan.
- Environmental control plans.
- Waste receipt monitoring.
- A program for completion of site preparation and carrying out construction works and initial installations.
- Methods of receiving, stowing, and covering of wastes.
- Site monitoring plans to measure the influence on the surrounding environment by taking samples of groundwater and landfill gas, and then analyzing them and taking corrective actions, if necessary.
- The method of transporting the wastes resulting from the treatment centers to the landfill.

Landfill Operation Technical Specifications--

Specifications relating to the operation of the landfill are contained in clause 5-2-7 of the Book of Conditions and Specifications. Upon completing construction, the contractor shall receive waste and perform the following operations twenty hours per day and seven days per week:

- Transport of all wastes from the composting facilities within twenty-four hours of processing. Wastes shall not be allowed to remain at the composting facilities for a period exceeding twenty-four hours from the time of their treatment.
- Receive, weigh, and record all data relevant to waste type, source, and means of transport.
- Disposal in prepared cells as previously specified in lifts not to exceed four meters in height and one hundred meters in width.
- Cover all disposed waste with a layer of earth not less than 15 centimeters in thickness.
- Continue extension of the leachate and gas collection networks as needed.

- Continue groundwater monitoring and gas migration detection.

- Treat leachate on a continuous basis.

- Maintain a supply of materials and spare parts as necessary for carrying out the required work.

Landfill Operation Reporting Requirements—

The Book of Conditions and Specifications (5-4-3-3.) requires the submittal of monthly reports with detailed information concerning Onyx's operational performance. Onyx shall submit monthly reports with detailed information on the quantities and kinds of waste delivered to the sanitary landfill, their weights, and kinds, and the manner in which they were delivered. The report shall include describe progress achieved in the cells and supporting leachate and gas control networks.

Onyx shall submit annual reports on the contract works executed during the previous year in accordance with Clause 5-4-4. The contractor shall also prepare the plan of work for the coming year, comprising any proposals or amendments required to increase operating efficiency.

Contractor Work Plan for Landfill Operation

The Work Plan submitted by ONYX for constructing and operating a new sanitary landfill (3.10) adequately addresses each of the work plan, technical, and reporting specifications, with one possible exception. A program for monitoring and sampling of groundwater quality has not been developed, as based on its site observations, ONYX has concluded that the bottom of the landfill site (quarry) is impermeable and that there is no connection with Lake Maryut.

Compliance with Technical Specifications--

Detailed plans addressing each of the technical specifications are provided in Work Plan 3.10. A brief summary of the plan for each follows.

Transportation of Waste from the Composting Facilities--

Rejected waste from the three composting facilities will be transported daily to the new landfill in compaction trucks. This will be 300 days per year since the composting facilities operate only six days per week.

Receiving, Weighing, and Recording--

All ONYX collection and transfer trucks will be equipped with pre-coded identity cards. Insertion of the card into the reader will confirm the truck's identification data. This data will include the type, source, and amount of waste being delivered, the driver and collection team names the receiving date and time, and the number of the cell where it will be disposal. A receipt will be issued to the driver and all information will be entered into the database for

summary and future analysis. At the end of each day a daily report will be issued for management review.

Waste Burial Procedures--

Waste received will be directed to the open area (approximately 3,000 m^2) of the appropriate disposal cell. After dumping, the waste will be spread in 30cm layers and compacted to a density of 0.9 t/m^3. When waste layers reach 2.5m in depth a 0.15m layer of soil, dust, and stone will be applied. Each cell will have a maximum depth of 5.0 m and will be covered with 0.5 m of final cover material. Additional details of the disposal plan can be found on Pages 57 through 59 of the Sanitary Landfill Work Plan (3.10).

Extension of Leachate and Gas Collection Networks--

Leachate collection network components will be extended as necessary to be in place prior to acceptance of waste in any cell. Additional gas collection wells will be installed upon completion of each cell. The detailed plans for extension are integrated into the descriptions of construction and installation plans referred to earlier.

Groundwater Monitoring and Gas Migration Detection--

The Work Plan does not provide for groundwater or landfill gas migration detection. The multi-layer liner and final cover system, together with the extensive gas collection network are designed to capture the vast majority of biogas produced.

Leachate Treatment--

The contractor has calculated that the quantity of leachate produced, if any, will be minimal. Leachate that is collected will be stored in a 2,300 m^3 storage basin and re-circulated through completed sections of the landfill rather than be treated. Details of the plan are provided on Pages 46 and 47 of the Work Plan.

Maintaining Supply of Materials and Spare Parts--

The maintenance of adequate levels of operating supplies such as cover materials, and spare parts for machinery and equipment are adequately addressed in the Work Plan.

Compliance with Reporting Requirements--

The Sanitary Landfill Work Plan acknowledges the monthly and annual reporting requirements and makes preliminary proposals for information to be included.

Monthly Reporting--

The Landfill operating manager will prepare monthly reports for submittal to the GOA Project Engineer that will include, but not be limited to the following:

- Quantities of waste received and buried daily; summarized by waste type and source (e.g., composting facility), and type of delivery vehicle.

- Description of waste cell construction progress.

- Description of road network revisions and new construction.

- Description of progress on landscaping, fencing, and any other initiatives to improve site aesthetics.

- Quantities of water, electricity, fuel, and cover material used.

- Findings from field monitoring such as leachate and gas production rates, leachate and gas characterizations, and meteorological findings.

- Results from sampling stored leachate.

- Calculation of compacted waste density based on incoming weight and topographical survey of burial area.

- Comparative analysis of volume utilized versus estimates contained in annual plan.

- Report on equipment and machinery utilization and performance.

- Summary of personnel resources used daily.

- Reports on accidents, fires, property damage, complaints from neighbors, and any work stoppage.

- Problems encountered, proposed solutions, and other concerns warranting Project Engineer feedback and/or formal discussion.

GOA Monitoring of Landfill Operations

To provide oversight for twenty-four hours per day, seven days per week will require a total of six landfill monitors reporting to the Project Engineer.

Landfill Operation Monitoring Activities—

Throughout the fifteen-year operational stage, the daily monitoring duties of the Landfill Monitors will include the following:

- Coordinating communication with the Composting/Transfer Station Monitors to ensure that all materials requiring disposal are delivered within 24 hours in a manner that does not adversely affect composting operations or traffic movement in the GOA.

- Monitoring weighing procedures to ensure that weighing data recording includes type, source, quantity, means of transport, and other data described in the Work Plan.

- Monitoring roads for maintenance conditions that facilitate expeditious and safe access and egress.

- Monitoring working face operations to ensure compliance with width, area, and depth specifications, good compaction practices to conserve capacity, and daily cover.

- Evaluating leachate and gas network installation progress and performance

- Ensuring that leachate and landfill gas samples are taken in compliance with monitoring schedules and practices approved by the GOA.

- Monitoring leachate storage and recirculation operations and performance.

- Monitoring contractor compliance with its plan for maintaining supplies and spare parts.

- Reviewing contractor monthly reports summarizing landfilled quantities and landfilling operations prior to contractor submittal to the Project Engineer.

- Attending regularly scheduled meetings with the Project Engineer to report on sanitary landfill conditions and discuss potential operational changes.

- Preparing weekly and monthly activity reports for the Project Engineer

- As required, prepare defensible documentation of contractor non-compliance with contract specifications that can result in assessment of fines (*Book of Conditions and Specifications* Clause 3-7-5):

    - Failure to apply adequate daily cover
    - Failure to comply with operational work plan
    - Failure to treat leachate
    - Failure to wash truck wheels
    - Failure to collect and treat landfill gas
    - Failure to comply with groundwater monitoring well sampling schedule

- Maintaining open communication and a positive working relationship with landfill contractor personnel.

During closure of the existing open dumps, Landfill Monitors will also be responsible for the following:

- Monitoring the progress of the open dump closure in relation to the schedule provided by the contractor.

- Evaluating if the contractor is closing the open dumps in accordance with the plan presented in the contract.

- Evaluating payment requests of the contractor and providing opinions to the Project Engineer.

- Monitoring the construction methods being used to determine if they are consistent with those provided by the contractor in the closure plan.

- Preparing daily, weekly, and monthly progress reports on the status of construction for submittal to the Project Engineer.

- Evaluating contractor compliance with the execution stage work plan

Monitoring Equipment and Supplies--

The Landfill Monitors will be carrying out their responsibilities in a wide range of working conditions ranging from the office to the landfill working face. To empower them to carry out their duties efficiently they need the following equipment and supplies:

- Uniforms including outdoor wear that identifies them as GOA employees.
- Immunizations to protect health from possible contact with all types of waste.
- Safety gear including eye protection, hard hats, and steel-toed shoes.
- First aid supplies.
- Offices space at the landfill and access to employee locker and shower area.
- Computer access
- Camera and film.
- Final design plans and drawings.
- Onyx's complete installation and operational plans and schedules.
- Measuring tools including basic survey equipment.
- Pre-printed forms for daily, weekly, and monthly reports on activities and observations.

MONITORING LANDFILL CLOSURE (EVACUATION)

The final stage of sanitary landfill monitoring is landfill closure (evacuation).

Landfill Closure Specifications

The Book of Conditions and Specifications contains specific requirements that the contractor must comply with in Clauses 4-2-3 and 5-3-4. During the evacuation stage the contractor must carry out the following obligations applicable to the sanitary landfill as stated in Clause 4-2-3:

- Cooperate with the GOA and any new contractor in executing the evacuation work plan and finish his work according to the plan.

- Continue to perform work as required in the operation stage through the last day of the contract period.

- Complete and carryout remaining obligations pursuant to the contract at the fixed dates.

Clause 5-3-4 addresses delivery of utilities and facilities at the end of the contract stating:

- The contractor shall deliver to the first party the utilities and installations, the latter placed at his disposal for the execution of the contract work, including the furnishings and the fixed lines, which the contractor improved through his rehabilitation and installation activities.

- Those utilities and facilities, as well as the installations shall be in good operational condition. Vehicles and mobile equipment shall remain the property of the contractor.

GOA Monitoring of Landfill Closure (Evacuation)

During this stage the daily activities of the Landfill Monitors will remain largely the same as during the operational stage. The monitors should ensure that all technical specifications continue to be complied with through the last day of operation. Monitors should exercise extra vigilance over the operation and maintenance of all equipment and facilities to ensure that usage and maintenance does not deteriorate during the final days of the contract.

During this stage, Onyx will be fulfilling its obligations relating to placement of final cover over all completed areas of the landfill. Monitors will be required to scrutinize this extremely critical final operational task to ensure compliance with technical specifications, as well as longer-term environmental protection and aesthetic objectives.

APPENDIX B

MONITORING PLAN FOR REHABILITATION AND OPERATION OF EXISTING COMPOSTING FACILITIES

INTRODUCTION

There are three existing composting facilities in the GOA with the design capacity to process approximately 25 percent of the residential and commercial waste currently collected. Optimal utilization of this capacity can make a significant contribution to extending the life of the newly constructed sanitary landfill while at the same time provide substantial benefit to the agricultural sector.

The contractor has been asked to rehabilitate, outfit, and operate all three facilities in a manner that will maximize potential benefits. Monitoring of the composting facility rehabilitation and operation activities can significantly enhance the probability of capturing this potential.

Monitoring of the contracted service for the waste treatment center rehabilitation and operation will take place over four successive stages:

- Design
- Rehabilitation (Preparation)
- Operation (Execution)
- Closure (Evacuation)

Monitoring activities prescribed for each stage are described separately below.

MONITORING THE COMPOSTING FACILITY DESIGN PROCESS

Monitoring contractor compliance with design process specifications is a prerequisite to the attainment of GOA objectives of optimizing existing waste diversion capacity and the life of the new sanitary landfill.

Composting Design Specifications

Clause 5-3-1 of the *Book of Conditions and Specifications* contains the following specifications relating to the design process for the composting facilities:

- Tenderers shall include in their offers the preliminary drawings for the rehabilitation of the composting facilities.

- Upon signing the contract, the contractor shall receive the sites on which the composting facilities are currently located, and shall begin preparing the comprehensive detailed drawings (design drawings) for the facility rehabilitation.

- These drawings shall be provided to the GOA to review and approve them, or to provide comments for modifications.

- The GOA shall approve the design prior to construction.

Contractor's Composting Facility Design Plans

The contractor is proposing significant changes to the existing design of the three existing composting facilities. Proposed changes have been accompanied by preliminary drawings as specified. These proposed design changes are described in detail in *Work Plan 3.7 Organic Composting Plants* of the contractor's tender offer and include the following:

- Reconstructing the recyclable material sorting line at Abbis Unit 1.
- Installing new trommel screens with plastic bag openers.
- Installing artificial ventilation units in fermentation area.
- Covering the fermentation, curing, and maturation areas.
- Replacing final product screening units at all three facilities.
- Increasing final product storage areas at all three facilities.

Specifics relating to the timing and the design process are not contained in the technical offer in a manner that complies with the design specifications listed above.

GOA Monitoring of the Composting Facility Design Process

The Project Engineer and Waste Treatment Center Monitors must study and attain complete familiarity with the work plan to enable judicious monitoring of the design approval and implementation process.

The Project Engineer will be responsible for oversight of the design process for the purpose of ensuring contractor compliance with all applicable procedural and technical specifications. The three composting facility monitors who will later be assigned to monitor operations during all operating hours will assist the Project Engineer. These monitors and the Project Engineer will work with the contractor to facilitate and expedite the design process as follows:

- Review the preliminary drawings for rehabilitation of the composting facilities and work plans for facility operation.

- Upon signing the contract, ensure that the contractor immediately begins preparing detailed facility rehabilitation and equipment installation design drawings.

- Review detailed drawings submitted to the GOA, make necessary inquiries and suggestions for any modifications.

- Document findings of non-compliance with design specifications and submit inquiries and/or proposed modifications to the contractor's composting facility design manager.

- Review contractor responses and attend regularly scheduled meetings with design personnel to facilitate and expedite problem resolution and consensus.

- Prepare and submit weekly composting facility design status reports to Program Administrator summarizing non-compliance items identified, proposed modifications, and areas of consensus.

- Prepare and submit a final report with recommendations to support GOA approval of complete composting facility design plans at the end of the design development and review process.

- Facilitate GOA approval process after contractor responds to inquiries and proposed modifications.

- Ensure that, upon GOA approval, the contractor prepares and submits a schedule for rehabilitation and outfitting of the composting facilities not exceeding one year from the date of the contract signing.

MONITORING THE REHABILITATION STAGE

The contractor has been asked to rehabilitate all three existing composting facilities in a manner that will maximize their potential benefit within economically sustainable funding levels. Intensive monitoring of facility rehabilitation construction can significantly enhance the probability of achieving both of these project goals.

Composting Facility Rehabilitation Specifications

The specifications for the rehabilitation and outfitting of the composting facilities are stated in Clauses 5-3-1 and 5-2-5 of the *Book of Conditions and Specifications*. The first (5-3-1) requires submittal of a schedule for execution of the required work within a period not exceeding one year from the date of contract. The schedule will be developed following the GOA's approval of the design drawings.

Clause 5-2-5 states that the services to be provided by the Contractor shall be determined for each of the existing composting facilities. The services will include rehabilitation, operation, and maintenance.

Contractor Composting Facility Rehabilitation Work Plans --

Clause 4-3-2 requires submittal of a work plan indicating the method of preparation as well as the following activities:

- Recruiting and employing the labor force and technicians required.
- Equipment procurement process and schedule.
- Equipment installation schedule .
- Project management.

- Administrative staff and labor force training.
- Time schedule for submission of design drawings.

Rehabilitation Stage Reporting—

Clause 5-4-2 of the *Book of Conditions and Specifications* requires monthly reports during the preparatory stage of the project demonstrating clearly the progress made by the contractor to date, with regard to each element of the work prescribed in the preparation plan. These reports must be submitted within one week from the end of the month being reported on, beginning one month after the start of the preparatory stage.

The reports must explain any delays or difficulties the contractor faces and steps taken to solve problems in coordination and cooperation with the GOA.

Contractor Composting Facility Rehabilitation Work Plan

To achieve the objectives of producing high quality compost at a marketable price, ONYX has proposed rehabilitation plans for the three facilities that concentrate on the following aspects:

- Personnel protection and safety through insurance of equipment compliance with standard measures and international specifications.

- Producing high quality marketable material by monitoring and controlling all waste preparation and treatment unit processes.

The modifications proposed for each facility are described in detail in the technical offer and can be summarized as follows:

- Abbis Unit 1

    - Compliance of equipment and systems with personnel safety and machinery protection standards and regulations.

    - Repair and renew mechanical and electrical equipment and machines.

    - Processing line modifications including changing the trommel and installing a screening system to separate coarse materials and residue by density.

- Abbis Unit 2

    - Compliance of machinery and equipment with personnel protection and safety standards and regulations.

    - Repair and renew mechanical and electrical equipment and machinery.

- Process line modifications including changing the trommel sieve size and installing a screening system to separate coarse materials and other contaminants by density.

- Transition from slow to fast fermentation by constructing a ventilation network to inject air under waste fines.

- Provide special equipment and creative systems to monitor waste fines.

- El Montaza Unit

  - Compliance of machinery and equipment with personnel protection and safety standards and regulations.

  - Repair and renew mechanical and electrical equipment and machinery.

  - Process line modifications including changing the trommel sieve size and installing a screening system to separate coarse materials and other contaminants by density.

Finally, the *Work Plan 3.7 Organic Composting Plants,* addresses in detail each of the issues required for inclusion in the Rehabilitation Work Plan.

GOA Monitoring of Composting Facility Rehabilitation

To ensure contractor compliance with the rehabilitation work plan, as well as the design drawings and contract details approved by the GOA, will require monitoring of all rehabilitation related activities. All work should be closely scrutinized for compliance with the final drawings and rehabilitation work plans submitted by the contractor.

The oversight responsibilities of the Project Engineer and composting facility monitors will include, but not be limited to, the following:

- Monitor compliance with the contractor's plan for recruiting and training of management, operation, and maintenance personnel.

- Inspection for compliance with final design specifications and rehabilitation work plan submitted to and approved by the GOA for each composting facility.

- Confirming compliance with the approved rehabilitation schedule.

- Identification of inadequate construction safety procedures or construction techniques that may adversely affect the safety and/or performance of subsequent facility operation and/or useful life.

- Monitoring contractor pre-testing of processing and emission (water, air, and odor) control equipment and process control systems.

- Daily reporting of all adverse findings from construction monitoring by the Project Engineer and Composting Facility Monitors to the Program Administrator

MONITORING COMPOSTING FACILITY OPERATION

Upon completion of the rehabilitation and outfitting of the three composting facilities, the contractor must commence execution of the Operational Work Plan submitted in his tender offer.

Composting Facility Operation Specifications

Specifications relating to the technical operation of, and reporting on, composting facility operations and reporting requirements are contained in Clauses 5-2-5 and 5-4-3-2 of the *Book of Conditions and Specifications,* respectively.

Technical Specifications--

Clause 5-2-5 contains the following technical specifications relating directly to the composting facility operation:

- Before emptying the wastes at the composting facilities, they shall be weighed with the site scales prior to entrance into each of the composting facilities.

- The rejected material and residual waste from the composting facilities shall be weighed using the site scales prior to removal for disposal.

- The composting facilities and equipment may be used by the contractor free of charge for the life of the contract.

- The contractor shall assume the maintenance of the sites delivered to him by the GOA at his own expense and shall keep them in good condition during the contract period.

- The contractor shall assume the operation and maintenance of composting facilities, and all equipment and installations related thereto, at its own expense.

- The installations shall remain in a condition of total cleanness.

- The execution of services shall be fulfilled according to the health conditions and rules in force.

- The composting facilities shall be available to receive waste approximately 6 days per week, from Saturday morning through Thursday evening.

- The contractor shall guarantee the provision of a minimum limit of services acceptable to the Governorate on Fridays and feast days.

- In case of sudden stoppage of work, even partially and for any reason whatsoever, the

contractor shall notify the GOA immediately and coordinate with it in taking the procedures it deems necessary to remove the causes of suspending the work and resume the work as soon as possible.

Monthly and Annual Reporting--

Clause 5-4-3 of the *Book of Conditions and Specifications* requires monthly reports during the operating stage of the project. These reports shall describe in detail the services performed.

Clause 5-4-3-2 includes special reporting requirements for the composting facilities. It requires the contractor to submit summary reports on the number of times domestic wastes were carried and transported to the composting facilities, times, and quantities of wastes as well as quantities of derived products from organic materials, wastes, and recyclable materials.

The report should include the organic fertilizer quantities produced during the month and the rejected quantities resulting from the processing. A separate report shall be submitted on each of the three centers, and a unified report comprising the data set forth therein.

Annual Reports are required by Clause 5-4-4. The contractor shall submit annual reports on the contract works executed during the ending year. The contractor shall also prepare the plan of work for the coming year, comprising any proposals or amendments required to increase operating efficiency.

Contractor's Work Plan for Composting Facility Operation

Work Plan *3.7, Organic Composting Plants*, submitted as part of the ONYX tender, addresses each of the composting facility operational specifications. Detailed operational plans for each of the three facilities are presented in Pages 64 through 69.

Specific technical specifications listed above are addressed as follows:

- Receiving and Weighing; Pg. 87-88
- Maintenance; Pg. 92-99
- Cleanliness; Pg. 91
- Health; Pg. 90-91
- Hours of Operation; Pg. 87-88
- Work Suspension Notification; Pg. 92

Monthly Composting Facility Reports--

The Monthly Operating Stage Report must summarize the results of the work performed in the field for the past month. In its work plan, the contractor has proposed providing the following information to comply with this requirement:

- Date and time of all waste received.
- Source and type of waste.
- Quantity (weight) and quality of waste.
- Total quantity of waste processed.
- Total quantity of materials recycled and recovered as compost.
- Total quantity of rejects and residue.
- Quantity of energy consumed.
- Quantity of water consumed.
- Log of recorded process line operating parameters including temperature and moisture levels.
- Maintenance work completed (preventive and emergency).
- Total hours of process line operation.
- Downtime of processing line.
- Number of personnel per shift.
- Quantities of compost sold and sale price.
- Chemical and physical characterization of compost from sampling.

GOA Monitoring of Composting Facility Operations

One Composting Facility Monitor will be assigned to each of the three composting facilities. Monitors will report to the Project Engineer, who will be responsible for ensuring compliance with contract terms and specifications.

Monitoring Activities--

Composting facility monitoring will include all of the following activities in order to optimize the benefit to be obtained:

- Monitor daily operations in each of the following areas.

    - Receiving and weighing.

        -- Ensure that all incoming waste is weighed accurately.
        -- Observe incoming waste to identify the most compatible waste sources
        -- Ensure that all output recovered material and residues are weighed.

- Pre-processing.

  -- Require sufficient contaminant removal.
  -- Require that optimal moisture levels be maintained.
  -- Identify need for carbon/nitrogen ratio adjustment.

- Composting Phase.

  -- Are elevated temperatures being maintained?
  -- Is the oxygen supply adequate?

- Ensure that the contractor is allowing sufficient time for final curing and production of high value compost.

- Marketing.

  -- Ensure that contractor tests for heavy metals; pathogens, excess salts and nutrient content, and make the appropriate sourcing or processing adjustments.

  -- Ensure that processing policies/procedures are promoting high value product production.

- Overall.

  -- Are the operational parameters being monitored and the methods used to maintain these parameters within the design limits?

  -- Are all residuals including rejects, process residuals, and air emissions being properly addressed?

  -- Is the contractor meeting promised levels of throughput and recovery?

- Monitor maintenance procedures and scheduling for compliance with requirements to keep the equipment and facility in good condition.

- Monitor contractor commitment to maintaining the entire site in a state of cleanliness and aesthetic compatibility with surroundings.

- Meet at regularly scheduled intervals with plant management to discuss observed operational deficiencies and efforts that the contractor will take to rectify them.

- Attend meetings of all composting facility monitors to facilitate transfer of best policies and practices between facilities.

- Prepare forms and reports documenting work activity on a daily, weekly, and monthly basis for submittal to Project Engineer.

- Develop reporting format and review monthly reports from contractor.

- Maintain open communication and a positive working relationship with landfill contractor personnel.

- As required prepare defensible documentation of contractor non-compliance with contract specifications that can result in assessment of fines (Book of Conditions and Specifications Clause 3-7-5):

    - Non-compliance with composting facility cleanliness requirements.

    - Failure to carry out maintenance to the equipment according to the schedule submitted.

    - Failure to operate on schedule.

    - Failure to produce compost pursuant to the specifications defined by Law 100/1967.

Before the determination of any of the above-mentioned fines, the GOA will notify the contractor of the violation and grant him an interval of at least twenty-four hours to provide a written response or correct the condition. During the first six months of operation the fines will be calculated at a rate of 25 percent of the stated value.

Analytical Monitoring Tools—

Temperature, oxygen levels, and odor are the most important indicators of how well composting is progressing. Thus, only three basic tools are required to monitor the performance of the actual composting process itself: a temperature sensor, an oxygen sensor, and the monitor's nose.

Odor-- Although it may be normal for some odor to be continually present at the site, strong putrid odors are a sign that something is wrong; that anaerobic conditions exist. A windrow may require turning, a problem that is inhibiting aeration may exist, such as a poor mix of raw materials, or odors could come from mishandling of raw materials. In any case, the monitor should be alert to odors, identify their source and request that the operator correct the situation.

Temperature -- Because the heat produced during composting is related directly to the microbial activity, temperature is the primary gauge for the composting process. Abnormally low temperatures are a signal of reduced aerobic microbial activity. This could mean the process is lacking oxygen or is slowed because of low moisture conditions. In most cases, a lack of oxygen is the cause. Therefore low temperatures usually call for turning or aeration. High temperatures (surpassing 140^{O}F) may call for turning or aeration to cool the pile.

A dial thermometer with a three to five-foot stem is recommended for low-cost monitoring of pile temperatures. Temperature testing is recommended at one- and three-foot depths along both sides of the windrow at 20-foot intervals. Temperatures should be checked in the same location in the windrow each day. If the thermometer does not pass readily into the windrow, bulk density may be higher than recommended, resulting in poor aeration.

Oxygen Levels—Oxygen monitoring equipment should be used in conjunction with thermometers to monitor compost in windrows. Oxygen sensors measure the oxygen level within the row, providing information on the current state of the composting process.
A 3 to 5 percent oxygen concentration is generally considered the minimum for sustainable aerobic composting.

. Oxygen sensing instruments can be used to monitor the oxygen concentration in the following:

- Raw feedstock.
- Actively composting piles.
- Curing piles.
- Finished and stored compost.

A typical configuration of a portable oxygen analyzer includes a perforated probe and a digital readout. The oxygen probe should be inserted to reach the center of the material being monitored.

When used together, temperature, oxygen level, and a keen sense of smell can combine to give the monitor a good indication of the health of the windrowed compost.

Monitoring Equipment and Supplies--

To optimize the effectiveness of the Composting Facility Monitors in assessing and encouraging contractor compliance, they should be provided with the following:

- Attractive uniforms identifying the GOA as their employer.

- Office space, furnishings, and telephone and computer access at the composting facility.

- Copies of contractor's rehabilitation, outfitting, and operations work plans.

- Tools to conduct random testing of process and product compatibility with design and work plans (see Analytical Monitoring Tools).

- Safety gear including eye protection, dust masks, hardhat, steel-toed shoes, and coveralls.

- Camera and film.

- Reporting forms to optimize communication with the Project Engineer.

MONITORING THE COMPOSTING FACILITY EVACUATION STAGE

The final stage of composting facility monitoring covers the contractor evacuation period at the end of the fifteen-year contract.

Composting Facility Evacuation Stage Specifications

The Book of Conditions and Specifications contains specific requirements that the contractor must comply with in Clauses 4-2-3 and 5-3-4. During the evacuation stage, the contractor must carry out the following obligations applicable to the composting facilities as stated in Clause 4-2-3:

- Cooperate with the GOA and any new contractor in executing the Evacuation (Closure) Work Plan and finish his work according to the plan.

- Continue to perform work as required in the operation stage through the last day of the contract period.

- Complete and carryout his other remaining obligations pursuant to the Contract at the fixed dates.

Clause 5-3-4 addresses delivery of utilities and centers at the end of the contract. The contractor is responsible for the following:

- Delivery to the GOA the utilities and installations, the latter placed at the GOA's disposal for the execution of the contract work, including the furnishings and the fixed lines which the contractor improved through his rehabilitation and installation activities.

- The utilities and centers, as well as the installations shall be in good operational condition. Vehicles and mobile equipment shall remain the property of the contractor.

- Cooperate with the GOA and any new contractor in executing the Evacuation (Closure) Work Plan and finish his work according to the plan.

Continue to perform work as required in the operation stage through the last day of the contract period.

In addition, the contractor must comply with Clause 5-2-5, which assumes that the contractor will maintain the sites delivered to the contractor by the GOA, at the contractor's own expense. The contractor shall keep them in good condition during the whole contractual period, on the understanding that any additions or further fixed structural fittings to be provided by the contractor shall become property of the GOA at the end of this period. The contractor shall not have the right to claim any charges or compensation.

Monitoring Composting Facility Evacuation (Closure)

During this stage, the daily activities of the monitor will remain largely the same as during the operational stage. The monitor should ensure that all technical specifications continue to be complied with through the last day of operation. The monitor should exercise extra vigilance over the operation and maintenance of all equipment and facilities to ensure that usage and maintenance does not deteriorate during the final days of the contract.

APPENDIX C

MEDICAL WASTE TREATMENT CENTER MONITORING PLAN

INTRODUCTION

Medical wastes that are collected from hospitals and clinics in accordance with the terms described in the *Medical Waste Collection Monitoring* section will be treated (incinerated) in a facility that will be constructed and operated by the same contractor. Clause 5-1-8 of the *Book of Conditions and Specifications* describes the Medical Waste Treatment Center as a center for the treatment of medical waste (see Clause 5-1-13 for complete definition). The contractor must establish the medical waste treatment center at the sanitary landfill site. It shall include all machines and equipment necessary for the treatment process.

Medical waste treatment requires personnel with specialized skills in technological processes. Strict contractor adherence to best available practices will be required in each processing step to meet environmental regulations and occupational safety and health standards.

Treatment center operation in accordance with the design parameters is a prerequisite for protection of worker health and safety and protection of the environment. Thus, intensive monitoring of all medical waste treatment center activities from receiving through ash disposal is warranted. Monitoring of the contracted service for medical waste treatment center construction and operation will take pace in four distinct stages:

- Design
- Construction (Preparation)
- Operation (Execution)
- Closure (Evacuation)

Monitoring activities prescribed for each stage are described separately below.

MONITORING MEDICAL WASTE TREATMENT CENTER DESIGN

Monitoring contractor compliance with technical design specifications and design and process requirements is a prerequisite to attainment of GOA environmentally responsible medical waste treatment and disposal objectives.

Medical Waste Treatment Design Specifications

The *Book of Conditions and Specifications* contains general and technical design specifications for the medical waste treatment center in Clauses 5-3-1 and 5-3-2, respectively. The following general specifications (Clause 5-3-1) apply to the design process:

- The contractor must provide the preliminary drawings of the treatment center.

- Upon signing the contract, the contractor shall receive the site on which the center shall be set up, and shall begin preparing the comprehensive detailed drawings (design drawings) of the installation works for the new center.

- The drawings shall be provided to the GOA for review and comment. The contractor shall then make agreed upon changes to the design and submit to the GOA for approval.

- Upon obtaining the GOA's approval of the drawings and design, the Contractor shall set a schedule for execution of the required works within a period not exceeding one year from the date of contract.

Technical specifications are provided in Clause 5-3-2 as follows:

- An environmental impact assessment (EIA) shall be made for the construction and operation of the incinerator prior to construction and operation.

- The contractor shall establish the medical waste treatment center and shall supply the necessary incinerators to conduct the work

- The incinerator shall be fitted with a double chamber for burning of not less than 1,100 degrees centigrade, and for a period of not less than two seconds for the secondary burning of combustion gases.

- The incinerator shall be supplied with an automatic device for lifting and disposing of the burned wastes (ashes) and for preventing manual handling and circulation of these wastes.

- The incinerators shall be fitted with electrostatic filters and the height of the exhaust stack shall not be less than two and one half times the height of the nearest building to the facility.

Contractor's Medical Waste Treatment Center Design Plan

The contractor submitted a plan with preliminary drawings of a medical waste treatment center that meets or exceeds the design specifications. The incinerator proposed consists of the following unit processes:

- Weighing and radiation detection system.

- Loading system including a separate loading entrance.

- Exhaust stack for the combustion unit two and one-half times the height of the nearest building.

- Two-dual stage combustion chambers; one with a capacity of 250 kg/hr and a second with a capacity of 350 kg/hr.

- Utilization of heat to produce electrical energy.

- A dry scrubber for emissions control (rather than electrostatic filter).

- Automatic ash removing system.

- Recovery system for residues from combustion.

- Washing and sterilization of medical waste storage containers.

- Digital process control system.

The contractor has proposed the use of dry scrubbing rather than electrostatic precipitation as a more effective and economical means of emissions control. In addition, the contractor has offered to develop a special cell at the sanitary landfill to bury medical wastes until the treatment facility is completed (one year).

Sterilization and burial of those wastes that are not amenable to combustion has been proposed as an alternative treatment. The sterilization process works as follows:

- Waste is crushed to facilitate the entrance of sterilizing liquid (vapor or microwave) between particles.

- Sterilization by liquids (vaporization or ionized wave or both) depending on the wavelength and heating time or both.

GOA Monitoring of the Medical Waste Treatment Center Design Process

The Project Engineer will be responsible for oversight of the design process for the purpose of ensuring contractor compliance with all applicable procedural and technical specifications. Three medical waste treatment center monitors will be assigned to monitor operations during operating hours will assist the Project Engineer. The Project Engineer will work with the contractor to facilitate and expedite each of the following steps required in the design process:

- Review of the preliminary drawings for construction of the medical waste treatment center and work plans for its operation

- Upon signing the contract the contractor receives the treatment facility site and begins preparing detailed building construction and equipment installation design drawings.

- Detailed drawings are submitted to the GOA for review, inquiry, and suggestion of any modifications.

- GOA approval provided after contractor responds to comments and proposed modifications

- The contractor carries out an EIA for review and approval by the Egyptian Environmental Affairs Agency (EEAA)

- Upon GOA and EEAA approval, the contractor must prepare and submit a schedule for construction and development not exceeding one year from the date of the contract signing.

Monitoring of the design process will require the following specific activities be performed by the Project Engineer with the assistance of the treatment center monitor:

- Review Preparation Stage Work Plan and preliminary drawings for familiarity and contractor compliance with the *Book of Conditions and Specifications* tender offer submittal requirements. The work plan should address the following at a minimum:

  - Recruiting and employing the labor force and technicians required.
  - Equipment procurement process and schedule.
  - Compliance with contract specifications and EEAA laws.
  - Project management.
  - Administrative staff training.
  - Time schedule for submission of design drawings.
  - Record keeping procedures.

- Review detailed drawings submitted for compliance with the technical design specifications contained in Clause 5-3-2 of the *Book of Conditions and Specifications* to ensure the following:

  - Design capacity of not less than two (2) tons each.

  - That the combustion unit is fitted with a double chamber producing processing temperatures of not less than 1,100 degrees Centigrade for a period of two seconds for the secondary combustion of gases.

  - An automated ash handling system is included.

  - Emission controls include a dry scrubber system.

  - The exhaust stack is not less than two and one half times the height of the nearest building to the facility.

- Document findings of non-compliance with design specifications and submit comments and/or proposed modifications to the contractor's medical waste treatment center design manager.

- Review contractor responses and attend regularly scheduled meetings with design personnel to facilitate and expedite problem resolution and consensus.

- Prepare and submit weekly medical waste treatment center design status reports to Program Administrator summarizing non-compliance items identified, proposed modifications, and areas of consensus.

- Prepare and submit a final report containing recommendation of GOA approval of complete medical waste treatment center design plan at the end of the design development and review process.

MONITORING MEDICAL WASTE TREATMENT CENTER CONSTRUCTION

Immediately upon receipt of GOA approval of final drawings and construction work plans, the contractor is to commence construction of the medical waste treatment center. The center must be completed within one year from the date of contract signing.

Medical Waste Treatment Center Construction Specifications

The specifications for the construction of the medical waste treatment center are stated in clauses 5-3-1 and 5-2-6 of *the Book of Conditions and Specifications*. The first, Clause 5-3-1 requires submittal of a schedule showing completion of the required work within a period not exceeding one year from the date of contract.

The second, Clause 5-2-6, references are procedural in nature regarding the timing of the steps to be taken to design, construct, and begin operations of the temporary disposal location in the sanitary landfill.

Clause 5-4-2 of the *Book of Conditions and Specifications* requires monthly reports during the preparatory stage of the project. These reports must be submitted within one week from the end of the month being reported on. The preparatory stage reports must clearly describe the progress made to date regarding all work prescribed in the preparation plan. It should be closely scrutinized for compliance with the work plan contained in the tender, as well as construction progress.

Contractor's Construction Work Plan

The contractor has suggested construction of the medical waste treatment center in stages to reduce GOA expense. A 9,000 square meter building and the incineration unit would be constructed at the new sanitary landfill site in the first year of the contract. When the volume of medical wastes approaches the capacity of the first unit, the second unit would be constructed.

In all other respects, Work Plan 3-2 of the tender submitted by the contractor, *Collection and Treatment of Medical Waste*, addresses all of the work force and equipment procurement issues required for inclusion in the Preparation and Construction Work Plan. The Medical Waste

Treatment Center monitors should review this document thoroughly to attain complete familiarity with the contractor's plan for medical waste treatment center construction.

Upon contract signing the contractor will be required to complete a final work plan including the scheduling of the facility design process, training, and the procurement of all-building materials, combustion system, and ancillary equipment.

GOA Monitoring of Medical Waste Treatment Center Construction

To ensure contractor compliance with the design drawings and details approved by the GOA, monitoring will begin with oversight of construction and equipment installation. The oversight responsibilities of the Project Engineer and treatment center monitors will include, but not be limited to, the following:

- Inspection for compliance with all final design specifications submitted to and approved by the EEAA and the GOA.

- Confirming compliance with the approved construction schedule.

- Identification of inadequate construction safety procedures or construction techniques that may adversely affect the safety and/or performance of subsequent center operation and/or useful life.

- Monitoring contractor pre-testing of processing and emission control equipment and process control systems.

- Daily reporting of all findings from construction monitoring by the Project Engineer to the Program Administrator.

- Monitoring contractor recruitment/training (operational and safety) of management personnel, technicians, and laborers specified in the EIA and the EEAA approval documents.

MONITORING MEDICAL WASTE TREATMENT CENTER OPERATION

Upon completion of facility construction, the contractor must commence execution of the Operational Work Plan submitted in his tender offer.

Medical Waste Treatment Center Operation Specifications

Specifications relating to the operation of the medical waste treatment center are contained in clauses 5-2-6 and 5-4-3 of the *Book of Conditions and Specifications.*

Monthly and Annual Reporting--

Clause 5-4-3 of the Book of Conditions and Specifications requires monthly reports during the operating stage of the facility. Annual Reports are required by clause 5-4-4. The contractor must provide the activities completed in the previous year as well as upcoming activities requiring any amendments required to increase operational efficiencies.

Contractor's Medical Waste Treatment Center Operations Plan

The combustion unit proposed by the contractor is designed to operate continuously so it will be operated 24 hours per day, seven days per week. Allowing 7 weeks per year for scheduled maintenance yields 7,500 hours of operation per year for each unit. Design capacity is 4,500 tons annually, but medical waste generation is not expected to exceed 2,000 tons in the first year.

The operating team will consist of 17 employees to manage incoming material, operate the system, and provide maintenance. Detailed descriptions of each of job functions, training, and safety procedures are contained in Work Plan 3.2.

Monthly Medical Waste Treatment Facility Reports--

The monthly operating stage report must summarize the results of the work performed in the field for the past month. The contractor's work plan describes the ability and commitment to record information concerning all aspects of treatment center performance. Therefore, the report submitted for medical waste treatment center operation should include the following information:

- Tons of medical waste received and processed.
- Amount of energy consumed in combustion process.
- Amount of excess energy available for use.
- Amount of water consumed.
- Amount of reactive material received.
- Status of maintenance performed.
- Number of working hours for the combustion unit.
- Date and time of unit downtime.
- Combustion unit temperatures.
- Emission control data such as CO, HCl, H_2S, and NO_2.
- Quantities of ash disposed (volume and weight).
- Analyses of ash and quench water.
- Record of preventative and emergency maintenance performed.
- Records of any worker injury.
- Training reports.

GOA Monitoring Of Medical Waste Treatment Center Operations

A specially trained Medical Waste Treatment Center monitor will be placed on–site during all hours of facility operation. Since the facility will be operated three shifts per day, seven days per week, three monitors will be required.

Monitoring Activities--

The activities of the Monitors will include, at a minimum, the following:

- Monitor medical waste handling and processing activities for compliance with work plan and contract terms.

- Ensure that all waste processing and emission control systems are operating within the design parameters.

- Monitor contractor compliance with previously approved and adopted plant health and safety procedures.

- Monitor operations for compliance with the medical waste regulations promulgated under Law 4/1994.

- Monitor record keeping procedures and results for completeness, accuracy, and efficiency of reporting all center input and output streams (including air and water).

- Monitor equipment maintenance procedures and equipment operating condition for judging compliance with contract terms.

- Prepare and submit weekly and monthly reports on pre-established forms to the Project Engineer summarizing monitoring activities and results.

- Coordinate with Medical Waste Collection Monitors to ensure that all tracking documentation is being completed as prescribed and reported to generators and government officials.

- Review Contractor's monthly reports and submit review and comment to the Project Engineer.

- Document alleged violations of laws or contract terms on standard forms for submittal to GOA legal staff.

Regarding the final activity listed above, the monitors should be aware that the contractor is subject to the following fines as prescribed in Clause 3-7-5 of the *Book of Conditions and Specifications*:

- In case of non-consistency of treatment centers cleanliness with work requirements, a fine will be imposed on the contractor in the amount of LE 2,000 per day until the violation is corrected.

- Failure to carry out preventative maintenance to the equipment according to the schedule submitted by the contractor with the work plan will impose a fine amounting to LE 300 per each piece of equipment that is not being maintained.

- In case of cessation from operating the treatment centers by the contractor, a fine amounting to LE 1,000 will be imposed for each day of non-operation.

Before the determination of any of the above-mentioned fines, the GOA will notify the contractor of the violation and grant him an interval of at least twenty-four hours to provide a written response or correct the condition. Moreover, during the first six months of operation the fines will be calculated at a rate of 25 percent of the stated value.

Monitoring Equipment and Supplies--

To conduct his/her duties in an efficient and cost-effective manner, the medical waste treatment center monitor should be provided with the following:

- Attractive uniforms identifying the GOA as his/her employer.

- Office space and furnishings at the treatment center.

- Computer and telephone access.

- Camera and film.

- Treatment center work plans including design drawings, construction plans and schedule, and operations plan.

- Safety equipment specialized for working in medical waste environment.

- First aid supplies.

- Inventory of medical waste collection trucks and database of all medical waste generators.

- Standardized forms for reporting daily weekly and monthly activities and assessment of contract compliance

MONITORING MEDICAL WASTE TREATMENT CENTER CLOSURE

The final stage of contractor operation of the medical waste treatment center that requires monitoring is the closure stage.

Medical Waste Treatment Center Closure Stage Specifications

The Book of Conditions and Specifications contains specific requirements that the contractor must comply with in Clauses 4-2-3 and 5-3-4. During the closure stage, the contractor must carry out the following obligations applicable to the medical waste treatment center as stated in Clause 4-2-3:

- Cooperate with the GOA and any new contractor in executing the Closure Work Plan and finish the work according to the plan.

- Continue to perform work as required in the operation stage through the last day of the contract period.

- Complete and carryout obligations pursuant to he Contract at the fixed dates.

Clause 5-3-4 addresses delivery of utilities and centers at the end of the contract stating that the contractor shall deliver to the first party the utilities and installations, the latter placed at his disposal for the execution of the contract work, including the furnishings and the fixed lines which the contractor improved through his rehabilitation and installation activities.

Those utilities and centers, as well as the installations shall be in good operational condition. Vehicles and mobile equipment shall remain the property of the contractor.

GOA Monitoring of Medical Waste Treatment Center Closure

During this stage, the daily activities of the monitor will remain largely the same as during the operational stage. The monitor should ensure that all technical specifications continue to be complied with through the last day of operation. The monitor should exercise extra vigilance over the operation and maintenance of all equipment and facilities to ensure that usage and maintenance does not deteriorate during the final days of the contract.

Monitors may be involved in a process of inventorying all of the equipment and supplies that are presently located on site on the last day of the contract period to ensure strict compliance with all specifications regarding property transfer.

APPENDIX D

WASTE COLLECTION, SWEEPING AND PUBLIC CLEANING SERVICE MONITORING PLAN

INTRODUCTION

The Waste Collection and Public Cleaning Monitors will be responsible for monitoring both the public use and contractor provision of the following services within their assigned geographic area:

- Waste Collection Services
  - Collecting Household and Domestic Wastes
  - Collecting Different Wastes and Garbage
- Sweeping and Cleaning Services
  - Mechanical Sweeping
  - Manual Sweeping and Garbage Pickup
  - Beach Clean-up
  - Cleaning Tunnels and Bridges
  - Cleaning Statues, Memorials and Fountains
  - Removal of Dead Animal Bodies

Monitoring activities associated with each of the service elements listed above are described in subsequent sections devoted to each.

General Contract Service Specifications

The basic premises for monitoring all waste collection and public cleaning services are the specifications contained in Clauses 4-3-2 and 5-4-2, 3, and 4 of the *Book of Conditions and Specifications,* which address work plan and reporting requirements.

Work Plan Requirements--

Clauses 4-3-2 (a) and (b) require submittal of preparation stage and execution stage (operation) work plans, respectively. These work plans were required to be submitted as part of the Tender. Since they apply to all waste collection, sweeping, and public cleaning services they will not be repeated in subsequent sections.

Preparation Stage Work Plan must describe activities to be undertaken in the first six months after contract signing and must address the following:

- Recruiting and employing the labor force and technicians required.
- Equipment procurement process and schedule.
- Equipment installation schedule.
- Maintenance of old buildings and construction of new buildings for housing workers.
- Project management.
- Administrative staff and labor force training.

The Execution Stage (operation) Work Plan must describe activities over the 15 year operational stage of the contract and must include descriptions of the following:

- Distribution of the scope of contract services into areas.
- Project management framework divided according to service areas.
- Labor force, vehicle instruments, and equipment and method of distributing them.
- Routes of waste collection trucks and mechanized sweepers.
- Service areas of manual sweepers.
- Number of shifts scheduled for each service.
- Capacities of trucks and equipment.
- Plans for servicing future population and tourist season increased demand.

Reporting Requirements—

Clauses 5-4-2, 3 and 4 of the *Book of Conditions and Specifications* address reporting requirements. Monthly reporting is required during the preparation stage as specified in Clause 5-4-2. The monthly reporting requirements include the following:

- The contractor must submit monthly preparatory stage reports on the process of work during the ending month within a period of one week from the last day of the month being reported on.

- The contractor shall provide to the GOA, within the execution stage, monthly reports on the work beginning one month after the start of the preparatory stage. The reports shall include detailed information on the ending month concerning the contractor's performance of all services.

- The reports shall clearly demonstrate the actual progress made by the contractor to date with regard to all of the work prescribed in the preparation plan submitted with the tender, and any modifications to be made in the preparatory dates, so as to accomplish the work.

- The reports shall explain any delays or difficulties the contractor faces or expects in order to take the necessary procedures for solving them in coordination and cooperation with the GOA.

Clause 5-4-3 of the *Book of Conditions and Specifications* requires monthly reports during the operating stage of the project. The contractor must provide the GOA, within the execution stage,

monthly reports on the work, in which shall be indicated detailed information on the ending month concerning his performance of all services.

With respect to waste collection and public cleanup activities the same clause specifies that the contractor must submit a summary report of the monthly work results in the field of waste collection including quantities of wastes raised from the districts. The reports must include the type of waste (domestic, commercial, industrial, etc.) and the lengths of streets duly swept, and the number of statues and memorials cleaned.

Annual Reports are required by Clause 5-4-4. The contractor must submit annual reports on the contract works executed during the ending year. The contractor shall also prepare the plan of work for the coming year, comprising any proposals or amendments required to increase operating efficiency.

Since these reporting requirements apply to each of the waste collection and public cleaning services, they will not be repeated in the subsequent sections that describe monitoring activities relating to individual services.

MONITORING WASTE COLLECTION SERVICES

The overall objective of monitoring waste collection services will be to optimize the compliance of the service contractor with general and specific waste collection service specifications. Separate descriptions of the monitoring plans for household and domestic wastes follow.

Monitoring Household and Domestic Waste Collection

This service comprises the collection and transport of household and domestic wastes (daily and for a period of seven days per week) from dwelling zones, markets, stores, highways, and streets to waste treatment or disposal facilities.

Monitoring will require observation of several waste generating sources (with the exception of medical and industrial) since the definition of domestic (household) wastes (Clause 5-1-9) includes:

- Household refuse, ashes and sweepings.
- Domestic wastes from institutions, commercial activities, offices, government buildings, squares, and gardens.
- Animal manure.
- Leaves and other trimmings from gardens, parks, and cemeteries.
- Commercial market and public festival wastes.
- Waste from schools, camps, and playgrounds.

- Wastes from jails and other public institutions.

- Material left on public roads.

- Ruins and debris from demolished buildings.

Household and Domestic Waste Collection Service Specifications --

The detailed service specifications provided in Clause 5-2-1 of the *Book of Conditions and Specifications* address three waste collection issues:

- The scope of collection services.
- Collection equipment related requirements.
- Waste pooling site containers and servicing.

Specifications addressing the scope of collection services to be provided specify that waste shall be collected daily from public places accessible to waste and garbage removal trucks, within containers, receptacles, or plastic bags, or any other receptacles, providing they do not conflict with other work terms and conditions. In those places that are not accessible to collection trucks, waste shall be placed by individuals in the waste pooling sites provided by the contractor in his work plan as approved by the GOA.

Four specifications relate to collection equipment and its use. These specifications include the following:

- It is absolutely forbidden to place any waste or objects inside or on the truck that might lead to scattering on the ground while moving.

- Collection teams shall report any incident that might have caused damage to third party property to the liaison officer who in turn will notify the GOA.

- The contractor shall have the waste carrying area of each collection truck washed at least once every week.

- Waste collection trucks that do not have hydraulic compaction shall be closed and covered.

Specifications relating to waste pooling site containers and their servicing include the following:

- The contractor is responsible for container placement and shall submit his proposal to the GOA indicating the sizes and kinds of containers that are suitable for different uses.

- The contractor is to provide containers in adequate numbers commensurate with the increased quantities of waste generated during the summer season.

- The contractor shall submit a program for monitoring, controlling, washing, sterilizing, and otherwise maintaining the containers to ensure their preservation and long useful service life.

- Containers shall be emptied without leaving any traces of waste on the ground.

Contractor Work Plans for Household and Domestic Waste Collection--

The contractor has submitted Preparation and Execution Stage Work Plans (see Work Plan 3.2 Solid Waste Collection) in his offer that addresses specific household and domestic waste collection specifications.

Scope of Collection Services--While proposing several different collection methods, the contractor's work plan is based on bringing daily collection service as near as possible to each household. Door-to-door service will be supplemented by the placement and servicing of 6,000 containers (3,000 new) at strategically located waste pooling sites.

The contractor has established 156 collection routes divided into 18 zones taking into account street widths, population density, and waste type. The contractor will provide maps for each door-to-door collection route that can be used by the GOA in establishing individual monitoring areas, routes, and work schedules.

Collection Equipment and Personnel--A variety of types and sizes of vehicles will be used to provide collection services both door-to-door and from waste pooling sites. The contractor will provide the GOA with a complete database of all equipment and personnel to be utilized in the collection and transfer of all wastes defined in the *Book of Conditions and Specifications* as household and domestic or different (oversized) to facilitate GOA monitoring. The equipment database will include the following information for each collection vehicle:

- Chassis make, model, and year.
- Body make, model, and year.
- Body type and capacity.
- All license and registration information.
- Assigned use: household and domestic or for different waste.
- Garage location and anticipated work area.

A collection personnel database will also be provided that will include the following information:

- Full name of each collection employee.
- Date of birth.
- Position or category of employment (driver or laborer).
- Crew assignment according to zone.

Each District will be provided with a list of equipment and personnel that the contractor will assign to each zone in that District.

Waste Pooling Site Containers and Service--The work plans submitted by the contractor are responsive to the specifications relating to container placement and servicing listed above. The adequacy of the response will be determined through the monitoring of waste container placement and servicing in the execution stage. In order for this to occur, the contractor will provide the GOA with a database of containers and their location in the preparation stage including the following information:

- Container location (in words and on maps) by zone.
- Number of containers at each location.
- Container size and type.
- Container identification number.
- Expected service frequency.

Each District will receive that portion of the database applicable to the zones within the District. Each waste-pooling site will be assigned to the appropriate monitor.

Meeting Monthly Reporting Requirements--On a monthly basis the contractor will submit summaries of work performed in each of the 18 collection zones to the appropriate GOA District Manager. Work performance summaries by zone will include the following at a minimum:

- Total number of hours worked per day.
- Number of waste collection trucks and personnel deployed daily.
- Number of places (set outs) waste was collected from.
- Total tons of waste collected per truck per day.
- Number of complaints received daily allocated by type with description of resolution.
- Disposition of all waste collected (transfer, compost, landfill).
- Problems encountered and concerns requiring discussion with District Manager.

On a monthly basis the contractor will submit summary reports regarding waste pooling containers and servicing that will include on a zone-by-zone basis:

- Updates to the database for containers.
- The number of times each was serviced.
- Actual or estimated tonnage collected.
- Number of trucks and personnel assigned to service.
- List of containers receiving maintenance or sanitation service.
- Number of complaints received with description of resolution.
- Problems encountered, proposed solutions, and other concerns.

GOA Monitoring of Household and Domestic Waste Collection --

Since some of the zones do not lie entirely within one District, some adjustments will be required in the number of monitors assigned to each District (see Exhibit 1). The District Manager will determine the number of routes assigned to each monitor. The number will vary between one

and three; dependent upon the level of monitoring required for the other locally based services in the designated monitoring area.

Monitoring Activities--The daily tasks of the monitors relating to household and domestic waste collection fall into the following three general areas:

- Monitoring waste generator (residential, institutional, and business) handling and storage practices.

- Monitoring contractor waste collection and transportation activities in the field.

- Evaluating contractor performance, record keeping, and reporting results.

Monitoring Waste Generator Activities--Achievement of waste collection objectives will require significant changes in the way that residents and businesses manage and store their waste for organized collection by the contractor. Door-to-door collection and changes in waste pooling locations will require changes in the waste handling procedures of the majority of GOA residents and businesses. Priority responsibilities of the monitors will be the facilitation of this transition in a way that optimizes service quality and improves overall neighborhood cleanliness.

During the project preparation stage (six-month period prior to full implementation of the new solid waste and public cleaning services) the following tasks will be completed:

- Obtain formal training from technical, legal, communications, and public relations professionals.

- Meet with appropriate contractor personnel to identify and agree on the best methods for motivating desired waste generator behavior.

- Meet with influential business and community leaders to inform and gain support for the changes that will be made during the implementation of the new services.

- Conduct door-to-door campaign within the geographic area (all collection routes) describing how and when the new services will be implemented and the obligations of waste generators.

While the above tasks will continue, beginning with contract execution, the following additional tasks will be required to improve waste generator compliance with GOA contractual and/or laws addressing environmentally acceptable waste handling practices:

- Observe individual resident and business waste accumulation and storage practices for compliance with all applicable local ordinances and national laws.

- Issue warnings and notices of non-compliance to violators.

- Provide advise on best waste storage and set out practices on a case-by-case basis.

- Receive and follow up on notification of alleged waste generator violations received from contractor personnel or the public on a daily basis.

- Prepare and submit status reports on dedicated evaluation forms to District Manager monthly regarding waste generator practices.

Monitoring Contractor Collection Activities--Monitors will be responsible for observing and evaluating the level of compliance of all collection related activities with contract terms and technical specifications. Monitoring activities will concentrate on the following three areas:

- Collection equipment and personnel.
- The door-to-door collection service.
- Waste pooling site containers and service.

The monitors will travel by auto along roads or by foot along sidewalks to observe the performance and results of collection activities in all portions of their assigned area. Monitors will observe and evaluate all collection personnel and equipment deployed on the routes within their jurisdiction for compliance with the service specifications listed earlier. They will also monitor the following:

- Collection vehicle appearance and sanitation; weekly washing is required.

- Collection vehicle maintenance and safety; should pose no threat to work crew or public safety.

- Proper collection personnel clothing, such as uniforms and safety gear are required to be worn by the workers.

- Evidence of scavenged materials; scavenging is prohibited.

At a minimum, monitors will ascertain the following from the field observation of door-to-door collection:

- Confirm if collection service is being provided daily (seven days per week).

- Confirm that service includes collection of all types of waste defined as domestic and household in Clause 5-1-10 of the *Book of Conditions and Specifications.*

- Identification of any public or private property damage resulting from collection activities.

- Identification of accumulations of different wastes (large sized wastes including rubble and building debris, furniture and appliances, bulky wastes, and auto parts) that need to be collected.

- Preparation of defensible documentation of contractor non-compliance with contract specifications that can result in assessment of fines (*Book of Conditions and Specifications Clause 3-7-5)*:

    - Disposing of collected waste illegally (places not designated by GOA).
    - Failure to submit reports regarding quantities removed monthly.
    - Failure of all workers to wear uniforms.
    - Inconsistency of appearance of collection vehicles.
    - Non-compliance of collection vehicles with traffic laws and public safety.

Monitoring of waste pooling sites will consist of observation and evaluation of the following:

- Container adequacy

    - Number.
    - Capacity.
    - User friendliness.
    - Waste containerization (prevention of littering and animal access).

- Container placement

    - Appropriate distance from dwellings/businesses.
    - Accessibility to targeted users.
    - Potential for impeding pedestrian or vehicular traffic.

- Container condition

    - Aesthetic appearance.
    - Maintenance.
    - Cleanliness.

- Site condition

    - Evidence of unauthorized scavenging.
    - Waste overflow.
    - Littering.
    - Burning.
    - Waste accumulation on ground.
    - Animal, rodent, bird and insect presence.

- Site servicing

    - Frequency adequate to prevent overflow.
    - Cleanup of any spillage.
    - Timing to minimize impediment to traffic flow.

- Preparation of defensible documentation of contractor non-compliance with contract specifications that can result in assessment of fines (*Book of Conditions and Specifications Clause 3-7-5*. This documentation may include the contractor's failure to empty containers pursuant to the program submitted in the work plan

Monitors are expected to subject each waste-pooling site in their service area to the above criteria at least once per week. Each monitor will be responsible for monitoring approximately 15 to 25 sites. Individual site reports specifying the precise location and the results of the evaluation will be submitted to the District Manager. Evaluations citing any deficiencies will be forwarded to the contractor for remedial action to be completed within 48 hours of notification.

All other observations will be recorded daily on a standardized form to be developed for consolidation of all waste collection, sweeping, and cleaning service monitoring information on a route-by-route basis. All findings will be submitted weekly to the Local Service Manager. An additional task will include responding to customer complaints concerning alleged service deficiencies and non-compliant contractor waste handling activities.

Monitoring Equipment and Supplies--To carry out the above responsibilities in the most efficient and productive manner, each monitor should be provided with the following equipment and supplies:

- Attractive uniforms identifying the GOA as their employer.
- Safety gear for occasional usage such as steel-toed shoes, hard hats, and safety glasses.
- Computer access at the District office.
- Cameras and film.
- An appropriate means of transportation depending on type/density of monitoring area.
- Reporting forms for daily, weekly, and monthly reports.
- Space, furnishings, and supplies at the District office.
- Route maps for collection trucks and mechanized sweepers.
- Schedules for each type of service under their jurisdiction.
- Inventory of waste pooling containers.
- Washing schedule for trucks and containers.

Monitoring of Collection of Different Wastes and Garbage

Oversized wastes such as appliance, furniture, rubble, and debris from building demolition, automobile parts, and any other wastes too large to collect from household or pooling site containers are defined in Clause 5-1-11 as different wastes. In view of the nature, type, size, and diversity of these wastes, the method of collection must be different than for household and domestic wastes.

Different Waste Collection Service Specifications--

GOA monitoring of the collection of different wastes is premised on assessing the compliance of the contractor with the service specifications included in Clause 5-2-1, which states the following:

- The contractor shall provide adequate numbers of trucks, equipment and containers to collect oversized furniture, appliances, building debris, automobile parts, and any other rubble thrown on sidewalks or streets.

- The contractor shall use suitable garbage trucks to collect the different wastes and garbage that are thrown on sidewalks or streets seven days per week.

Contractor Work Plans for Collection of Different Wastes and Garbage--

The work plan for collecting the diversity of wastes defined as "different" submitted by the contractor does not appear to comply with all work plan requirements. It appears that only one collection truck with a crane has been allocated to collect the estimated 100 tons per day of this material. The contractor seems to suggest that much of the material can be incorporated with household and domestic wastes. An additional team to retrieve and dispose of abandoned automobiles is also suggested, but no details are provided concerning routes, schedules, or system capacity.

Finally, it appears that the contractor favors implementation of periodic collection of different wastes perhaps 3 or 4 times per year, as opposed to "anytime" or "on call" service. No reference is made to any plans for reporting.

GOA Monitoring of Different Waste Collection--

In view of the ambiguity and incompleteness of the work plan, the first activity will need to be discussions with the contractor with the purpose of developing a work plan that adequately addresses different waste collection needs.

Ultimate accomplishment of GOA different waste clean-up objectives will require more than just monitoring contractor compliance with the work plan and technical service specifications. To reduce the ubiquity of accumulations of oversized wastes, and their health, safety, environmental, and aesthetic impacts, monitors will contribute to a pro-active campaign to reduce their occurrence. Specifically, the role of the monitor will include the following:

- Promotion of the availability of oversized item collection on an on-call basis at no cost to the generator.

- Identification of disposed oversized items and prompt reporting to contractor.

- Exploring options for diversion (reuse/recycling).

- Enforcing local and national litter/waste disposal laws.

- Confirming that requests for contract service are carried out within 24 hours on a seven-day per week basis.

- Preparation of defensible documentation of contractor non-compliance with contract specifications that can result in assessment of fines (*Book of Conditions and Specifications Clause 3-7-5)*:

  - Failure to dispose of wastes collected in places designated by the GOA.

  - Failure to remove wrecked or abandoned vehicles within 72 hours after being notified by the GOA.

MONITORING SWEEPING AND CLEANING SERVICES

Sweeping and cleaning services as described in the *Book of Conditions and Specifications* include all of the following:

- Mechanical sweeping.
- Manual sweeping and garbage pickup.
- Beach cleaning.
- Cleaning tunnels and bridges.
- Cleaning statues, memorials, and fountains.
- Removal of dead animal bodies.

The monitoring activities associated with each of these services are discussed separately in the following sections.

Monitoring Mechanized Sweeping

This service is comprised of mechanized sweeping of all GOA streets and roads to which the mechanized sweepers can have access.

Mechanized Sweeping Service Specifications--

In addition to the work plan and reporting specifications discussed earlier, monitoring of mechanized sweeping service is premised on the following specific service specifications contained in Clause 5-2-2 of the *Book of Conditions and Specifications*:

- The contractor shall provide adequate numbers of trucks, equipment, and containers to collect oversized furniture, appliances, building debris, automobile parts, and any other rubble thrown on sidewalks or streets.

- The contractor shall clearly indicate in the plan of work the itineraries and accompanying schedules of the distribution of the mechanized sweepers on detailed maps of the GOA.

- The contractor shall use vacating and dumping stations to supply water to and allow dumping of the mechanized sweepers to minimize long travel distances.

Contractors Mechanized Sweeping Work Plan--

The mechanized sweeping work plan submitted by the contractor in the tender proposes alternatives to the specifications listed above. The contractor proposes to sweep "main" roads twice weekly or on an as needed, rather than daily, basis as specified. The contractor proposes to provide 15 vacuum sweepers with only 10 working eight hours daily. No information is provided relating to their productivity or adequacy to perform this service as specified.

Itineraries and schedules have not been furnished. There is no mention of vacating stations other than the waste pooling sites.

While the *Book of Conditions and Specifications* contains no service specifications for washing, it is included in the definition of "sweeping and cleaning services" (Clause 5-2-2). To that end, the contractor has included washing of all main roads that also receive mechanized sweeping service. Two mobile washing vehicles with 8,000 liter capacity are proposed to wash 53 streets and public places described in *the Book of Conditions and Specifications* once weekly.

All of these issues will have to be resolved through the development of compliant preparation and execution work plans before the details of monitoring activities can be firmly established.

Mechanized Sweeping Reporting Plans--The contractor's work plan contains no reference to the need to summarize the results of work performed in the field on a monthly or annual bases. The reports submitted for mechanized sweeping should include the following information for each street scheduled for mechanical sweeping:

- Sweeper route number and zone.
- Scheduled sweeping dates.
- Sweeper identification number performing each sweep.
- Name of sweeper operator.
- Total km scheduled for sweeping.
- Total km swept.
- Time sweeping commenced and completed.
- Tons of sweepings collected and disposed.
- Volume of debris dumped in cubic meters.
- Listing of missed streets, along with explanation for miss.
- Approximate number of parked cars using on-street parking.
- Any other information useful for improving future sweeping service.

GOA Monitoring of Mechanized Sweeping Service--Monitoring of mechanized sweeping will be performed simultaneously with all other waste collection and sweeping monitoring. To accomplish GOA cleaning objectives will require that equal attention be devoted to waste generators and the service contractor. Without any reduction in the indiscriminate littering habits of the public it will be practically impossible to fairly judge the sweeping performance of the contractor. Thus, the monitoring activities will include the following:

- Enforcing litter laws and promoting positive individual and business behavior.

- Monitoring mechanized sweeper routes for compliance with work plan itineraries and schedules.

- Inspecting vacating and dumping stations for aesthetics and timely sweepings removal.

- Interact with scavengers in an attempt to reduce the negative impact of their material recovery efforts.

- Preparation of defensible documentation of contractor non-compliance with contract specifications that can result in assessment of fines (*Book of Conditions and Specifications Clause 3-7-5)*:

    - Failure to sweep the streets according to the schedule submitted in the work plan.
    - Failure to wash the main streets according to the schedule submitted in the work plan.
    - Failure of workers to wear uniforms.

GOA Monitoring of Manual Sweeping and Garbage Pickup Service

The GOA considers manual sweeping and garbage pickup to be a highly important service, as it is critical to achieving the required level of cleanliness in all areas covered by the contract. This service is considered as complementary to mechanized sweeping, especially in the places not accessible to mechanized sweepers. The maintenance, cleanliness, and emptying of garbage baskets also fall within the scope of manual sweeping services.

Manual Sweeping and Garbage Pickup Service Specifications --

The following are service specifications as described in Clause 5-2-2 of the *Book of Conditions and Specifications:*

- The contractor shall set forth a clear plan determining the itineraries of manual sweeping and garbage pickup workers taking into account the nature of the districts, streets, and commercial or residential density.

- The contractor shall render the manual sweeping and garbage pickup service seven days per week on main roads and highways, six days per week on internal roads and passageways, and during all ordinary work hours in open commercial markets seven days per week.

- The contractor shall provide additional teams for manual sweeping and picking up garbage within worship house sites and also in public gardens, commercial streets, hotels, and restaurants on Fridays, Sundays, and religious holidays.

- The contractor shall submit in his offer maps identifying the specific locations where garbage baskets should be placed.

- The contractor shall provide sweeping and garbage pickup workers attractive hats and uniforms, and the necessary tools (wheeled carts, sweepers, shovels, rakes, and tongs) to enable them to perform their work most satisfactorily.

- Workers must wear uniforms in the performance of their work.

Contractor Manual Sweeping and Garbage Pickup Service Work Plans--

The contractor has proposed to employ 974 persons to perform the manual sweeping and garbage pickup services required. Workers will be issued uniforms, carts, and equipment as specified in the service specifications. The work plan promises to, but does not address the itineraries or specific sweeping schedules specified for certain areas in the service specifications.

The plan calls for purchase and distribution of 3,000 garbage litter baskets. Existing litter containers that are largely unused will be removed. It does address where and how they shall be placed, as well as how they will be serviced in Section 4.6 of Work Plan 3.3, City Cleaning.

Manual Sweeping and Garbage Pickup Service Reporting--As discussed earlier, Clauses 5-4-2 and 5-4-3 of *the Book of Conditions and Specifications* require monthly reports during the preparatory and operating stages of the project. Contractor plans for compliance with these requirements are not addressed in the work plan submitted with the Tender.

The revised work plan to be submitted for manual sweeping and garbage pickup should include plans to provide the following information:

- Sweeper zone and assigned area number.
- Scheduled sweeping dates.
- Manual sweeper identification number.
- Total km or area scheduled for sweeping.
- Total km or area swept.
- Time sweeping commenced and completed.
- Estimated pounds of sweepings collected and disposed.
- Volume of debris dumped in cubic meters.
- Number of garbage baskets in place on sweeper route.
- Number of times garbage baskets emptied.
- Estimated volume of waste collected from garbage baskets on route.
- Last date garbage basket was cleaned.
- Specific problems encountered.
- Recommendations and proposed modifications to service for improvement.

GOA Monitoring of Manual Sweeping and Garbage Pickup--

Monitoring should take into consideration that manual sweeping is considered complementary to mechanized sweeping. On routes that receive both types of service it will be difficult to

distinguish between the performances of each. As there is a direct relationship between the opportunity to dispose of materials in public places and the amount of litter and garbage that ends up on public streets, the placement and servicing of the garbage baskets play an important role. The important thing is for the combined performance to be in compliance with the street cleanliness expectations of the GOA.

Daily Monitoring Activities--In addition to all of the monitoring activities listed for mechanized sweeping the contractor should add the following:

- Evaluate manual sweeping resource allocation, routing, and frequency for strict compliance with increased service specifications for religious days and holidays.

- Enforce uniformed employee requirement.

- Monitor garbage basket locations for:

  - Adequacy.

    -- Number.

    -- Capacity.

    -- User friendliness.

    -- Waste containerization (protection from wind and animal access).

  - Placement.

    -- Appropriate distance from dwellings/businesses.

    -- Accessibility to users.

  - Basket condition.

    -- Aesthetic appearance.
    -- Maintenance.
    -- Cleanliness.

  - Site condition

    -- Evidence of scavenging.
    -- Waste overflow.
    -- Littering.
    -- Animal, rodent, bird, and insect presence.

- Site servicing

  -- Frequency adequate to prevent overflow.
  -- Cleanup of any spillage.
  -- Timing to minimize impediment to traffic flow.

- Preparation of defensible documentation of contractor non-compliance with contract specifications that can result in assessment of fines (*Book of Conditions and Specifications Clause 3-7-5).* Fines can be assessed for the following per Clause 3-7-5:

  - Failure to sweep the streets according to the schedule submitted in the work plan.
  - Failure to wear required uniforms.

Evaluating Street-Sweeping Performance--Clause 5-2-2 of the *Book of Conditions and Specifications* references of the GOA objective of "maintenance of the required level of cleanliness in all areas of the contract". A standard needs to be established for what qualifies as "the required level of cleanliness". How can the monitor measure cleanliness? Studying the public's perception and expectations of street and sidewalk cleanliness can allow for the development of scorecard cleanliness measures. Ratings can be based on a seven-point scale of cleanliness with descriptions as follows:

- Acceptably Clean (meets "required level of cleanliness")

  - 1.0 - A clean street. No litter.

  - 1.2 - A clean street, except for a few traces or pieces of litter.

- Not Acceptably Clean

  - 1.5 - No concentration of litter. There are no piles of litter, and there are large gaps between pieces of litter, or small gaps between pieces of litter.

  - 1.2 - Litter is concentrated in spots; there may either be large gaps between piles of litter, or small gaps between pieces of litter.

  - 2.0 - Litter is concentrated and there are only small gaps between piles of litter.

  - 2.5 - Litter is highly concentrated with no gaps in the piles of litter. The litter is straight line along the curb.

  - 3.0 - Litter is very highly concentrated and there are no gaps between the piles of litter. The litter is a straight line along and over the curb.

Monitors record separate ratings for a fixed sample of individual "segments' of a street and sidewalk in each zone two to four times per month. The local manager ensures that the sample is

statistically and geographically representative. The monthly schedule is designed to vary to ensure representative inspections of actual street conditions, including:

- Who rates the zone.
- What time of day the ratings are conducted.
- Which day of the week the ratings are conducted.
- Which week during the month the ratings are conducted.

Inspections can occur before street cleaning to evaluate public behavior and after street cleaning is done to measure contractor performance.

Monthly scorecard reports are produced to provide information on both the average ratings given to streets and sidewalks, as well as the percent of total streets rated acceptably clean. Zones are then weighted by street mileage. Zones with more street mileage have more weight in determining overall District and GOA cleanliness figures.

To ensure quality control for the scorecard ratings the monitors should undergo quality assurance checks by the local service area manager and retraining if necessary. Monthly "cross-checks" will also evaluate rating consistency between monitors and inspections can be monitored to detect potentially biased ratings. Ratings that may be in error should be dropped with streets rated again when necessary.

The monthly reports should be analyzed carefully. They show the historical trend of the average cleanliness rating and the percent of all streets and sidewalks meeting the standard required of the contractor. Very small changes (<0.1) in the rating are not meaningful. It must also be remembered that month-to-month cleanliness is influenced by many factors in addition to contractor efforts, including seasons and weather, citizen compliance with parking rules, community events, and religious holidays. Therefore, the following best identifies meaningful trends and the performance of the contractor:

- Comparing the most recent monthly ratings to the same month of the previous year.

- Calculating quarterly averages for the percent of streets and sidewalks rated acceptably clean.

- Comparing zone ratings to other zones in the same District.

Monitoring Beach Cleaning

There is a direct relationship between the beach cleanliness and the number of holiday makers that choose Alexandria as their vacation destination. Improving the quality and cleanliness of its public beaches is very important for increasing tourism and economic development in the GOA.

Beach Clean-up Service Specifications --

The following service specifications relating to beach cleaning are taken from Clause 5-2-2 of the Book of Conditions and Specifications:

- The contractor shall maintain all areas of sand beaches clear of any wastes and scattered garbage by using suitable tools and containers, garbage pickup work teams, and mechanical combing machines.

- The contractor shall take into consideration increased beach usage during weekend holidays, feasts, official holidays, and the June through September summer vacation period, and shall provide a plan to perform the cleansing works daily during these periods to ensure a high level of cleanliness.

As for all services, Clause 4-3-2 requires the contractor to submit preparation and execution stage work plans with the offer. Submittal of monthly reports during preparation and execution of the service is required in Clauses 5-4-2 and 5-4-3, respectively.

Contractor Beach Cleaning Work Plans—

Based on a complete survey of all beaches listed in the *Book of Conditions and Specifications,* the contractor has identified those that can be cleaned using mechanical equipment and those that can only be cleaned manually. These are listed separately with the beach length requiring cleaning in Table 1of Work Plan 3.4, *Beach Cleaning*. In the normal season the beach cleaning team will consist of the following:

- One mechanical beach cleaner.
- One driver.
- Four laborers.

In the summer season the team will be expanded to include the following:

- Three mechanical beach cleaners.
- Three drivers.
- Fourteen laborers.

In addition, in the summer season 300 fixed waste receptacles will be placed at intervals of 50 meters along all public beaches, as well as at all beach entrances. Waste receptacles will be serviced daily. The specification requiring daily cleaning during the summer and on religious holidays is not addressed.

GOA Monitoring of Beach Clean-up Service—

Some of the waste that ends up on the beach result from inadequate storage of household wastes and the littering of streets and roads. Thus, the selected approach of assigning the monitoring of all of these activities to the same monitor for a specific geographic territory is logical and creates synergy.

Daily Monitoring Activities--To accomplish GOA beach cleanliness objective of "maintaining all sand beaches clear of any waste and scattered garbage" and "ensuring a high level of cleanliness" will require constant oversight of all waste generators and beach users, as well as the work of the beach-clean contractor. Specifically, monitoring must entail the following activities:

- Enforcing regulations that prohibit littering.

- Promoting good waste containment practices at homes, businesses, and by beach users.

- Monitoring service for compliance with service specifications and the contractor's approved execution work plans for summer and normal seasons:

  - Management and supervision.
  - Level of personnel and equipment resources applied.
  - Frequency and timing of service (must be daily in summer).
  - Transfer and disposal of collected debris.
  - Servicing of fixed receptacles in the summer season.
  - Record keeping and reporting procedures.
  - Adherence to health and safety rules.

- Maintenance of "a high level of cleanliness".

- Preparation of defensible documentation of contractor non-compliance with contract specifications that can result in assessment of fines (*Book of Conditions and Specifications Clause 3-7-5).* Non-compliance by the contractor would include failure to clean the beaches according to the schedule submitted.

Evaluating Contractor's Overall Beach Clean-up Performance--The contractor is required to "ensure a high level of cleanliness." The GOA should develop a measurable, rather than subjective standard. One commonly used benchmark is the average number of cigarette butts that remain in random samples of a specified area of beach. Cigarette butts are used because it is assumed that any larger debris should be removed in any reasonable clean-up effort.

Monitoring Tunnel and Bridge Cleaning

The cleanliness of tunnels and bridges is an indivisible part of the sweeping and cleaning services. Monitors will therefore be responsible for integrating monitoring of this service with other waste collection and public cleaning monitoring duties.

Tunnel and Bridge Cleaning Service Specifications—

The *Book of Conditions and Specifications* includes the following service specifications for tunnel and bridge cleaning in Clause 5-2-2:

- The contractor shall submit a work plan for the machines and equipment necessary for maintaining the cleanliness of tunnels and bridges.

- The contractor shall prepare and equip special teams to perform this service satisfactorily.

- In the work plan, the contractor must submit a work program that guarantees maintaining the cleanliness of these installations.

As for other services, submittal of separate preparation and execution stage work plans with the original tender and filing of monthly reports are also required during the preparation and execution stage periods.

Contractor Tunnel and Bridge Cleaning Work Plans—

The tender offer submitted by the contractor contains no reference to the cleaning of tunnels and bridges. Preparation and execution stage work plans will have to be received before monitoring plans can be finalized.

A preparation stage work plan needs to submitted that addresses the following:

- Recruitment, training, equipping, and housing of a specialized labor force.
- Procurement of equipment and tools with expected delivery dates.
- Service management and supervision.

An execution stage work plan needs to be submitted which addresses the following:

- Work distribution into areas, defining team numbers, duties, and expected productivity.
- Cleaning frequency and timing.
- Worker transportation equipment to be used.
- Tools and mechanized equipment to be used.
- Cleaning methodology and techniques.
- Health and safety policies to be followed.

Contractor Tunnel and Bridge Cleaning Reporting--The need to submit preparation and execution stage monthly reports that demonstrate clearly the progress being made on all aspects of the work prescribed are were not included in the tender. The contractor's execution stage monthly reports should summarize the results of the work performed and should include:

- The cleaning dates for each tunnel and bridge (by zone).

- Type of equipment and used.

- Type of cleaning detergents and/or chemicals used.

- The number of personnel utilized (GOA wide).

- Total number of hours spent.

- Specific problems encountered.

- Recommendations for overcoming any impediments and/or improving service quality and efficiency.

GOA Monitoring of Tunnel and Bridge Cleaning--

The Waste Collection and Public Cleaning Monitor will have the responsibility for seeing that the contractor complies with all service specifications for cleaning all tunnels and bridges in their assigned area. To do so will first require that each monitor be provided with a complete list of such structures in his assigned area. In addition, the contractor should provide his proposed cleaning schedule for these same structures. Monitoring will consist of the following activities:

- Observing tunnels and bridges to determine if "cleanliness is being maintained".

- Determining if appropriate cleaning agents are being used.

- Assessing the adequacy of cleaning frequency.

- Assessing the impact of cleaning activity on public safety and traffic flow.

- Confirming that the contractor has notified the GOA of any maintenance needs.

- Record all field observations on standard daily monitoring forms and submittal of those forms to the District Manager.

- Comparing field observations with contractor monthly reports.

- Reporting discrepancies between field observations and contractor monthly reports to the District Manager.

- Maintaining a cooperative and productive relationship with contract management to facilitate identification of best practices for accomplishing service objectives.

Monitoring Statue, Memorial, and Fountain Cleaning

The cleaning of statues, memorials, and fountains is also one of the services included under Sweeping and Cleansing Services.

Statue, Memorial and Fountain Cleaning Service Specifications—

The *Book of Conditions and Specifications* contains the following service specifications in Clause 5-2-2:

- The contractor shall clean statues, memorials, and fountains existing within the scope of the contract once a month.

- The stands and bases of the statues that are made of marble and tiles shall be cleaned once every two weeks.

- The statues established and made of stone or concrete shall be washed with water and light detergent.

- The stands and bases of the statues and memorials shall also be washed.

- Paper wastes and debris shall be removed from the area surrounding the base.

- Statues made of any material other than stones and concrete shall be washed in a safe manner to avoid causing any structural or aesthetic damage.

- The contractor shall notify the Governorate via the liaison officer about the memorials, statues, and fountains that need maintenance, so that it may in turn direct its own teams to repair them.

Clause 4-3-2 requires submittal of separate preparation and execution stage work plans, and Clause 5-4-3 requires monthly reports during the preparation and execution stage periods.

Contractor Statue, Monument, and Memorial Cleaning Work Plans—

The contractor proposes to use two high-pressure mobile washers mounted on eight-meter cranes to clean statues, monuments, and fountains. The work plan conforms to the cleaning frequency requirements of one time per week for marble statues and once monthly for the remainder of the statues.

Compliance with other specific technical specifications have not been addressed in the work plans submitted with the tender.

Contractor Reporting--Preparation and execution stage monthly reports are not addressed in the work plans submitted.

It is recommended that execution stage monthly reports include at least the following information indicative of contractor compliance with service specifications:

- The cleaning date for each statue, memorial, and/or fountain.
- The number of personnel utilized (GOA wide).
- The number and types of equipment used.
- Total number of hours spent.
- Specific problems encountered.
- Identification of each statue, memorial, or fountain needing maintenance.
- Recommendations for overcoming any impediments and/or improving service quality.

GOA Monitoring of Statue, Memorial and Fountain Cleaning Service—

The Waste Collection and Public Cleaning Monitor will have the responsibility for seeing that the contractor complies with all service specifications for cleaning all statues, memorials, and fountains in his assigned area. To do so will first require that each monitor be provided with a complete list of such structures in his assigned area. In addition, the contractor should provide his proposed cleaning schedule for these same structures. Monitoring will consist of the following activities:

- Confirm that stands and bases of statues that are made of marble and tiles are cleaned once every two weeks.

- Confirm that only water and light detergent are used for cleaning statues made of stone or concrete.

- Confirm that stands and bases of all statues and fountains are washed.

- Confirm that paper and other debris has been removed from the area surrounding the base of statues and memorials.

- Confirm that statues made of any material other than stone or concrete are washed in a safe manner without causing damage.

- Confirm that the contractor has notified the GOA of any maintenance needs.

- Record all field observations on standard daily monitoring form and submit to the District Manager.

- Compare field observations with monthly reports

- Report discrepancies between field observations and contractor monthly reports to the District Manager.

- Preparation of defensible documentation of contractor non-compliance with contract specifications that can result in assessment of fines (*Book of Conditions and Specifications Clause 3-7-5)*. The contractor will be in non-compliance due to failure to clean statues, monuments and memorials according to the schedule submitted in the work plan.

Monitoring the Removal of Dead Animal Bodies

Dead animal bodies left in streets and other public places rapidly attract vermin, insects, and birds, emit foul odors, and are in general a threat to public health and safety. The task of removing dead animal bodies is part of the sweeping and cleaning services.

Dead Animal Body Removal Service Specifications--

The only specification in the Book of Conditions and Specifications relating directly to dead animal removal is the service specification in Clause 5-2-2 that states the sweeping teams shall immediately remove the dead animal bodies they find on the roads and streets.

The general specifications for preparation and execution stage work plans, and monthly and annual reporting requirements also apply.

Contractor Dead Animal Body Removal Work Plans--

The contractor's tender offer addresses the removal of dead animal bodies in Section 4-9-4 of Work Plan 3.2, *Solid Waste Collection*. Identification of service needs will originate from manual sweepers and waste collectors who will transmit information to supervisors equipped with mobile telephones.

Dead animal bodies will be collected and removed using a small truck equipped with a winch for loading. Bodies will then be covered with lime.

Dead Animal Body Removal Reporting--

Monthly reports to the GOA should contain the following information (reported by zone) relating to the pick up and removal of dead animal bodies:

- Date and time of each removal activity.
- Source of request for removal.
- Kind of animal removed.
- Remedial measures taken at removal (if any required).
- Disposition of carcass.
- Problems encountered and impediments to expeditious service.
- Recommendations for service plan revision to improve effectiveness.

GOA Monitoring of Dead Animal Body Removal--

Monitoring of this service will be integrated with monitoring of household waste collection and public cleaning services. Efforts should concentrate on minimizing the occurrence of dead animal disposal in the public domain, while expediting remediation of incidences that are identified. Activities associated with monitoring of dead animal body removal includes the following:

- Informing the public of the health hazards of illegitimate disposal.
- Identifying dead animal removal service needs and contacting contractor.
- Following up on service requests.
- Monitoring compliance with contract terms and specifications, as well as the work plan submitted by the contractor.
- Reviewing dead animal body monthly reports for compliance with reporting requirements and compatibility with actual observations.
- Working with the contractor to improve response time and overall service quality.

APPENDIX E

MEDICAL WASTE COLLECTION MONITORING PLAN

INTRODUCTION

Medical wastes include those infectious wastes generated in the diagnosis, treatment, or immunization of human beings or animals in research or in the production or testing of biological products. Previous studies have estimated that between 6 and 10 metric tons per day are generated in the GOA.

In view of the nature of medical wastes and the risks they constitute to those that come in contact with them during collection, the GOA has separated this service from the rest of the waste and garbage collection services. This service comprises the collection of medical wastes from hospitals, dispensaries, laboratories, and other medical activities.

MEDICAL WASTE COLLECTION SERVICE SPECIFICATIONS

Medical wastes are defined in Clause 5-1-13 of the *Book of Conditions and Specifications* as non-household wastes of hospitals, dispensaries, clinics, laboratories, and pharmacies. (Radioactive, nuclear, and toxic wastes are excepted from the foregoing).

The following elements shall be considered medical wastes covered by this service:

- Category (A):
  - All tissues of human body, including blood as well
  - Wastes constituting danger to workers, when dealing therewith, such as the wastes resulting from cases of contagious diseases.
  - Dressings and bandages resulting from operation theaters and polluted wastes resulting from treatment rooms.
- Category (B) comprises used injection syringes and needles, broken glass and all sharp pieces and polluted tools.
- Category (C) wastes includes clinical laboratories, the morgues, and polluted wastes from research laboratories.
- Category (D) includes waste generated from pharmacies.
- Category (E) includes containers, boxes, used bags for taking urine samples, feces or feminine towels, and others.

Service specifications are contained in Clause 5-2-3 of the *Book of Conditions and Specifications* and are summarized in the following:

- The contractor shall provide the means necessary for the transport of medical waste from hospitals, dispensaries, laboratories, and other medical activities to the medical waste treatment center.

- The contractor shall submit its plan for collecting the medical waste indicating the way of handling this type of waste.

- The contractor shall include in the work plan that it submits, the steps and safety instructions, and the methods it shall follow in collecting the medical wastes. The work plan should include the kinds and descriptions of the containers it will be using and the means of transport, as well as the protective tools and clothes it shall provide to medical waste collection workers.

- The contractor shall submit to the GOA a table indicating the type and specifications of boxes and bags to be used for collection of medical wastes.

- The contractor shall collect medical wastes six days a week.

As for all services, Clause 4-3-2 requires the contractor to submit preparation and execution stage work plans with the offer. Submittal of monthly reports during preparation and execution of the service is required in Clauses 5-4-2 and 5-4-3, respectively.

CONTRACTOR MEDICAL WASTE COLLECTION WORK PLANS

The tender submitted by the contractor contains a work plan, *3.6 Collection and Treatment of Medical Wastes,* that addresses each step required for safe and environmentally compatible collection and transport of medical wastes. The contractor has committed to supplying equipment and manpower to collect up to 4,600 tons of medical waste per year. The steps proposed for the collection of medical wastes include the following:

- Training generators to identify and separates medical wastes.

- Providing advice on best packaging material to use and making them available for purchase.

- Assisting generators in designing internal collection systems.

- Providing aluminum containers (1,200 liter) for storage of packaged waste.

- Providing four trucks and drivers for customized collection needs.

- Using on-board scales to weigh wastes collected.

- Instituting a medical waste tracking system to account for quantity and status of waste from collection point through treatment and disposal.

- Cleaning and sterilization of trucks and containers.

- Providing information to generators regarding recycling options, improved handling, and emergency response procedures.

Details concerning the procurement and deployment of resources associated with each of the above-proposed steps are provided in the work plan.

Medical Waste Collection Reporting--

Since the contractor has offered to implement a formal medical waste tracking system, detailed information concerning the amounts and frequency of collection will be readily available. The monthly report submitted to each local monitoring office should include the following information by collection zone:

- Weight/volume and type of waste collected from each medical waste generator (with name, address and type of facility).

- Copy of manifest confirming disposition of waste at medical waste treatment center.

- Time and date of service.

- Number of containers on site at each generator.

- Confirmation of truck and container washing frequency.

- Problems encountered, complaints received and proposed modifications to improve service quality and/or efficiency.

GOA MONITORING OF MEDICAL WASTE COLLECTION SERVICE

Protection of public health and safety is an incontrovertible priority of the GOA. The collection of medical wastes deserves special oversight and monitoring due to the potential threat which mismanagement can pose to the health of medical institution workers and the general public.

One monitor will be assigned specifically to oversee all aspects of medical waste handling and collection in each District that has ten or more hospitals and clinics. Those Districts with ten or more hospitals and clinics include Montazah, Shark, Wassat, Gharb, and Ameriya. The Gharb monitor will cover Gomrouk hospitals and clinics and the Ameriya monitor will cover clinics in Borg El-Arab.

In all cases, the overriding objectives of the monitors should be to ensure the following:

- Adequate training of hospital personnel in the identification of medical wastes and the proper handling procedures awaiting removal.

- Proper management within the generating sources including separate storage.

- Ensuring appropriate measures to protect health care and solid waste workers are in place.

- Strict contractor compliance with service specifications and work plans.

The monitors will oversee a tracking system analogous to hazardous waste tracking whereby the whereabouts of all medical wastes are monitored from point of generation to their final disposition at the medical waste treatment center. The purpose of the tracking system will be to provide the following:

- Tracking the transportation of medical wastes from the generator to the treatment center to ensure proper treatment and disposal.

- Assuring the generator of medical waste that the medical waste was received at the treatment center.

- Establishment of a uniform set of papers (manifests) for tracking medical wastes.

Monitoring Activities

The medical waste collection monitors will devote their time to working with generators in the adoption of best practices for identifying, handling, and storing medical waste. In addition, the medical waste collection monitors will be responsible for overseeing the collection activities of the contractor. These activities will include the following:

- Assisting the contractor in the training of health care and custodial personnel at generating sites in the use of best practices for handling and storing medical wastes.

- Monitoring the contractor's tracking system to follow all medical wastes from their source to the treatment center.

- Evaluating contractor collection activities for compliance of collection and transportation procedures with approved work plans including the following:

    - Safety instructions
    - Collection methods.
    - Description of the containers to be used.
    - Means of transport.
    - Protective tools and clothing.

- Facilitating the sale and distribution of bags and boxes provided by the contractor to the generating sites.

- Investigating inquiries and complaints from generators regarding any contractor non-compliance with collection schedules, safety procedures, and/or performance.

- Preparation of defensible documentation of contractor non-compliance with contract specifications that can result in assessment of fines (*Book of Conditions and Specifications Clause 3-7-5)*. Contractor non-compliance may include the following:

  - Failure to collect medical wastes from all generators in accordance with the schedule.

  - Failure of workers to wear required uniforms

  - Disposal of collected waste other than at the medical waste treatment center.

  - Failure to submit monthly reports documenting quantities of medical waste collected.

  - Failure to properly identify collection vehicles.

  - Failure to operate collection vehicles in accordance with traffic laws and public safety regulations.

- Preparing forms and reports documenting daily, weekly, and monthly monitoring activities for submittal to the District Manager.

- Coordinating the tracking system with the medical waste treatment center monitor.

Monitoring Equipment and Supplies

To enhance monitor effectiveness, as well as ensure personal safety and health, medical waste collection monitors should be provided with the following:

- Attractive uniforms identifying the GOA as their employer.
- Safety gear for occasional usage including gloves, masks, eye protection, and coveralls.
- Computer facilities at the District office or medical waste treatment center.
- Cameras and film.
- Automobiles for efficient transport of training materials.
- Training materials for use at hospitals and with collection personnel.
- Medical waste collection route maps/schedules.
- Inventory of medical waste collection vehicles with license numbers.
- Specifications and samples of bags and boxes supplied by contractor.

APPENDIX F

INDUSTRIAL WASTE COLLECTION MONITORING PLAN

INTRODUCTION

According to the Ministry of Electricity there are 650 industries within the GOA. Based on a survey conducted by the contractor, it is estimated that approximately 100,000 tons of industrial waste are generated annually. Distribution of these industrial firms is very uneven with the majority of the industries located in the Districts of Montazah, Gharb, and Ameriya.

The *Book of Conditions and Specifications* specifies that the contractor shall collect wastes from every industry in the GOA on a seven-day per week basis. To ensure that this major contract service is carried out as specified by pertinent final contract terms will require a substantial monitoring commitment on the part of the GOA.

INDUSTRIAL WASTE COLLECTION SERVICE SPECIFICATIONS

Industrial wastes are defined in Clause 5-1-12 of the *Book of Conditions and Specifications* as the wastes resulting from industrial establishments and companies, like factories and power generating stations, with the exception of dangerous wastes, special wastes and liquid wastes.

Service specifications are contained in Clause 5-2-4 of the *Book of Conditions and Specifications.* The service specifications include the following:

- This service shall include the collection of industrial wastes daily, six days a week for those wastes, which are determined in item (5-1-12) of Article 5.

- The contractor shall carry out a comprehensive survey of industrial zones to determine the quantities and kinds of wastes resulting from that area.

- The contractor shall provide and distribute containers suitable for the different sizes and kinds of industrial waste.

- Since these wastes cannot usually be compressed, suitable containers shall therefore be provided to perform this service, and transport them to the defined disposal location.

- As regards the household and domestic wastes and garbage resulting from the industrial zones, the compaction trucks shall collect them seven days a week from the containers appropriated and which are distributed and their locations shall be determined in coordination and cooperation with the delegates of the government.

- Factory owners shall place all industrial wastes and municipal garbage in the containers appropriated for each of them separately. The contractor shall notify the delegate of the GOA of any violations that occur in mixing these wastes together in order to take necessary measures with the violator.

As for all services, Clause 4-3-2 requires the contractor to submit preparation and execution stage work plans with the offer. Submittal of monthly reports during preparation and execution of the service is required by Clauses 5-4-2 and 5-4-3 of the *Book of Conditions and Specifications,* respectively.

CONTRACTOR INDUSTRIAL WASTE COLLECTION WORK PLANS

Work Plan 3-5 of the contractor's tender offer, *Industrial Waste Collection and Treatment*, provides detailed information relating to the preparation and execution of industrial waste collection service. The Work Plan places strong emphasis on working with individual industries to improve waste handling practices and in identifying ways to reduce the production of wastes at the source.

The contractor surveyed 646 out of a total of 1,632 industries identified by the Ministry of Electricity. Based on the survey, the total tonnage of industrial waste was estimated to be approximately 100,000 tons per year.

The contractor proposes to deploy 35 trucks from five garages to collect industrial wastes as specified (daily) during the first six months. Fifteen cubic meter containers will be provided for industrial wastes and one cubic meter containers for domestic type garbage.

Based upon experience gained over the first six months, the contractor proposes to reduce collection frequency of industrial wastes to every other day and ultimately to match service with individual industry needs.

An administrative staff of ten persons is proposed to supervise operations and to work with individual industrial customers in identifying material recycling opportunities and better waste handling practices.

Industrial Waste Collection Reporting

Clause 5-4-2 of the *Book of Conditions and Specifications* requires monthly reports during the preparatory stage of the project. These reports must be submitted within one week from the end of the month being reported on. The preparatory stage reports must clearly describe the progress made to date regarding all work prescribed in the preparation plan. It should be closely scrutinized for compliance with the preparation plan contained in the tender.

The monthly report submitted for collection of industrial wastes should provide the following information for each industrial waste collection zone:

- Total tonnage of industrial waste collected.
- Breakdown of disposal between composting facilities and the sanitary landfill.
- Updated database of industries served with number and type of containers provided for both industrial and domestic wastes.
- Number of trucks and drivers assigned to industrial waste collection.
- List of violations of waste separation specification.
- Problems encountered.
- Recommendations for changes in service provision that will improve quality and achievement of GOA industrial waste collection and overall project objectives.

GOA MONITORING OF INDUSTRIAL WASTE COLLECTION

All Industrial Waste Collection Monitors should conduct detailed reviews of the Industrial Waste Collection and Treatment Work Plan to be adequately informed of the policies, procedures, and overall plan that they will be monitoring.

Ensuring that all industries are supplied with an adequate level of waste collection service as specified in the final contract will require approximately one monitor for every 100 industries. The actual number will be dependent upon the extent of industry concentration within a given District, the quantities and types of waste generated, and the agreed upon frequency of collection between the industry and the contractor. A preliminary allocation of monitors among Districts based upon subjective judgment of industry concentration is illustrated in Exhibit 1. Based on information gathered by the contractor, the number assigned to each District will have to be revised.

Since collection of industrial waste will be a service that the GOA has had no previous involvement in, a significant amount of information will need to be gathered during the preparation stage of the contract. This information will include the waste quantities generated and the specific container type, size, and collection frequency requirements of each. While the contractor has made some progress in identifying individual generation and service needs, it is unlikely that he will have a complete database of industries that are eligible for service.

There is certain to be some confusion as to what qualifies as an "industry" and what are legitimate service demands. Many qualifying industries that will not have confirmed service with the contractor are likely to call the District office for assistance in doing so.

Monitoring Activities

The duties of the Industrial Waste Collection Monitor will include, but not be limited to, the following:

- Assisting the contractor in the development of a complete database of industries to be serviced and determination of their specific service needs.

- Responding to requests for service from individual industries.

- Monitoring industry compliance with waste handling and storage regulations

- Working with the contractor and individual industries to investigate and identify ways to reduce waste generation

- Monitoring contractor performance by conducting random surveys of individual industry satisfaction with all aspects of service including:

  - Compliance with service schedule.

  - Provision of appropriate containers.

  - Cleanliness around container after dumping.

  - Non-interruption of production.

- Conducting random visual audits of waste container contents to certify separation of industrial, domestic and hazardous wastes.

- Providing informal mediation of disagreements between contractor and industry pertaining to waste designation, container type/size needs, collection frequency, and quality of service.

- Meeting regularly with contractor's industrial waste collection manager to discuss problems and identify ways to continually improve service performance.

- Preparing forms and daily, weekly, and monthly reports of monitor's work activity for submittal to District Manager.

- Preparing forms and reports that are required to assess industrial waste generator and contractor compliance with local and national laws and contract terms.

- Review and comment on contractor's monthly reports before submitting to district Manager.

- Preparation of defensible documentation of contractor non-compliance with contract specifications that can result in assessment of fines (*Book of Conditions and Specifications Clause 3-7-5)*:

- Failure to collect industrial wastes from all generators in accordance with the schedule.

- Failure of workers to wear required uniforms.

- Disposal of collected waste other than at locations designated by the GOA.

- Failure to submit monthly reports documenting quantities of industrial waste collected.

- Failure to properly identify industrial waste collection vehicles.

- Failure to operate collection vehicles in accordance with traffic laws and public safety regulations

Monitoring Tools and Supplies

Industrial waste collection monitors will be required to do a moderate amount of driving and will be exposed to a wide range of working conditions in the performance of their duties. Empowering them to conduct their activities in a safe and productive manner will be facilitated by provision of the following:

- Attractive uniforms identifying the GOA as their employer.
- Safety gear including steel-toed shoes, coveralls, eye protection, and hard hats.
- Computer access at the District office.
- Cameras and film.
- Small automobile for transportation.
- Industrial waste collection route maps from the contractor.
- An inventory of industry contact names/telephone and waste container information.
- Lists of contractor trucks to be used in their assigned area.
- Measuring devices to determine container sizes and requirements.
- Reporting forms for daily, weekly, and monthly reports.